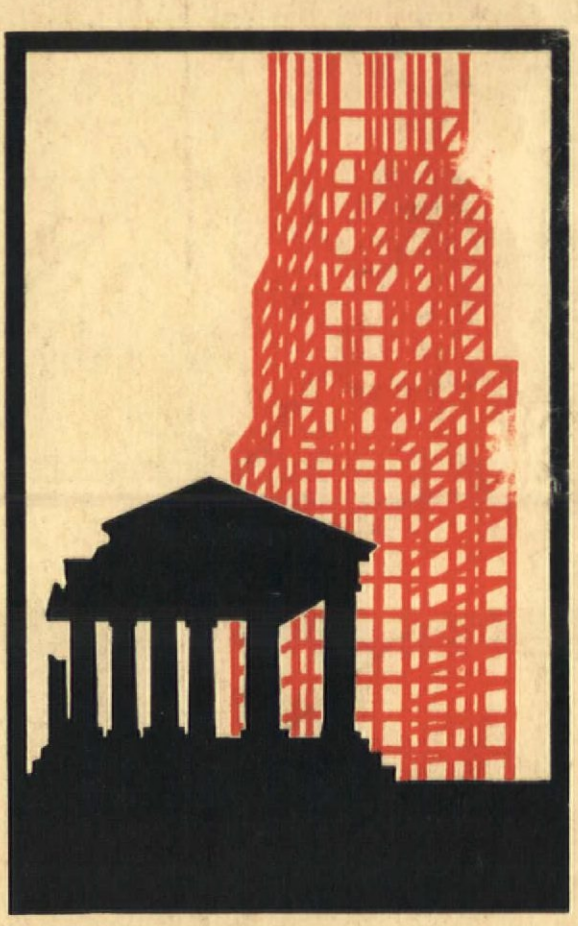
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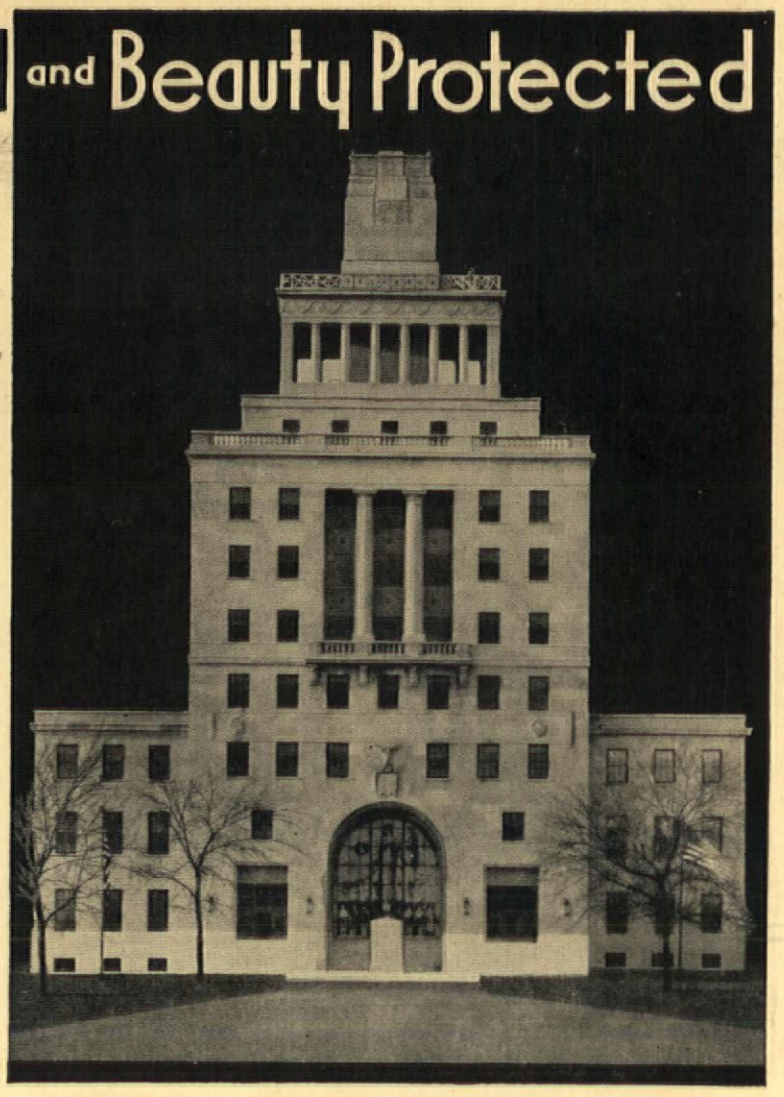
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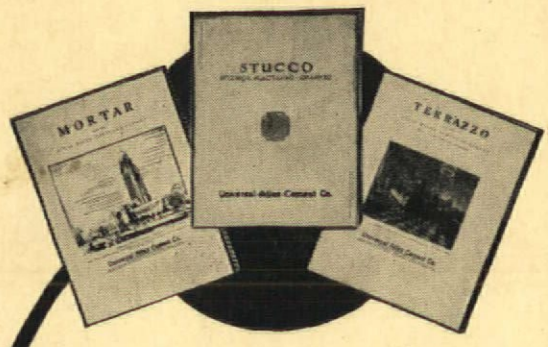
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Beauty Created and Beauty Protected



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Published Monthly by F. W. Dodge Corporation, 115–119 W. 40th St., New York

Truman S. Morgan, *President* Sanford D. Stockton, Jr., *Secretary* Howard J. Barringer, *Treasurer*

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Yearly Subscription: United States, Insular Possessions, Cuba, Canada, Central America, South America, and Spain, $5.00; Foreign, $6.50; Single Copy, 75c.

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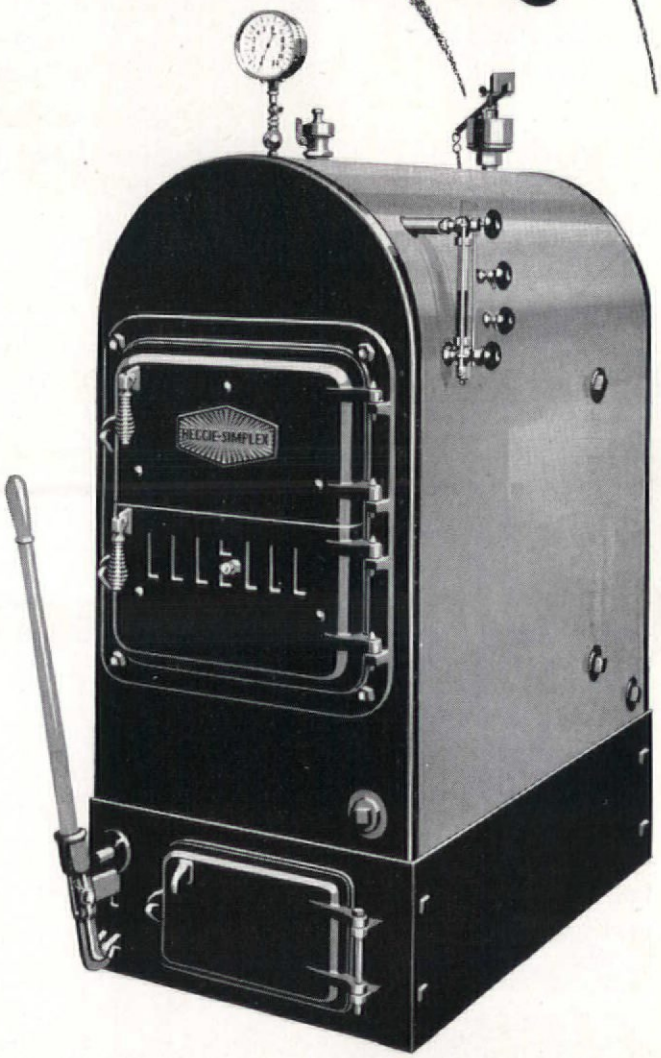
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PERMANENT

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STAINLESS

Black and Jade Vitrolite
Displayed In Modern Bathroom

Luxurious beauty combines with utmost practicality in the distinctively modern bathroom shown above. It is owned by C. H. Langer, Powhatan Apartments, Chicago.

Highly polished, black ashlar slabs of Vitrolite wainscoting contrast with washable gold paper walls and ceilings. A narrow cap of jade green Vitrolite along the wainscoting enhances the rich coloring. Carved marble and gold bathroom fixtures and golden-tan tile floor complete the modern effect.

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Note the four Vitrolite finishes illustrated in black at side of page

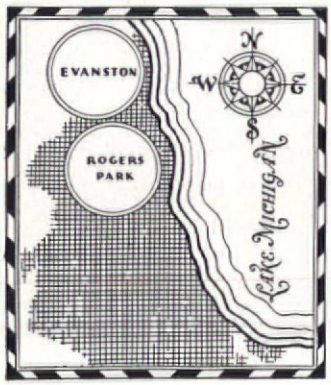
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The Ladies Speak for Themselves~



and They Continue to Favor Walnut

With the introduction of the so-called "modern" methods of interior decoration, there has been a good deal of vague conjecturing as to what the people really like. So we determined to find out, definitely and directly.

The communities of Evanston and Rogers Park on Chicago's North Shore were selected as representing the cream of the mass market. Independent investigators asked the housewives of those communities what woods they preferred, what kind of paneling was their first choice, and what woods they preferred in furniture.

Here's the Story of Walnut's Popularity

In answer to the question: "If without regard to cost, you could have your choice, which wood would you prefer for Dining Room Paneling?":

41.5% of all the women asked gave a positive preference for walnut.

60% more women preferred walnut than the next most popular wood. Walnut was five times as popular as the third ranking wood.

In the case of paneling for Living Rooms:

44.2% of the women preferred walnut. This was nearly twice as many as expressed a choice for the next most popular wood.

Great emphasis was placed upon harmony—a factor of importance even in those cases where women did not actually prefer paneling but where they did want such woods as were used in their homes to harmonize with their favorite furniture wood.

55.3%—more than half—stated that they preferred walnut furniture. This was 177% greater preference than for any other wood. And twice as many women prefer a home furnished throughout in walnut as favor any other group of furniture.

No matter what style of furniture was preferred, American Walnut was unfailingly the most preferred wood.

Even among the women who favored Colonial styles, 45% also preferred it in American Walnut—nearly twice as many as those who wanted Colonial furniture in any other wood.

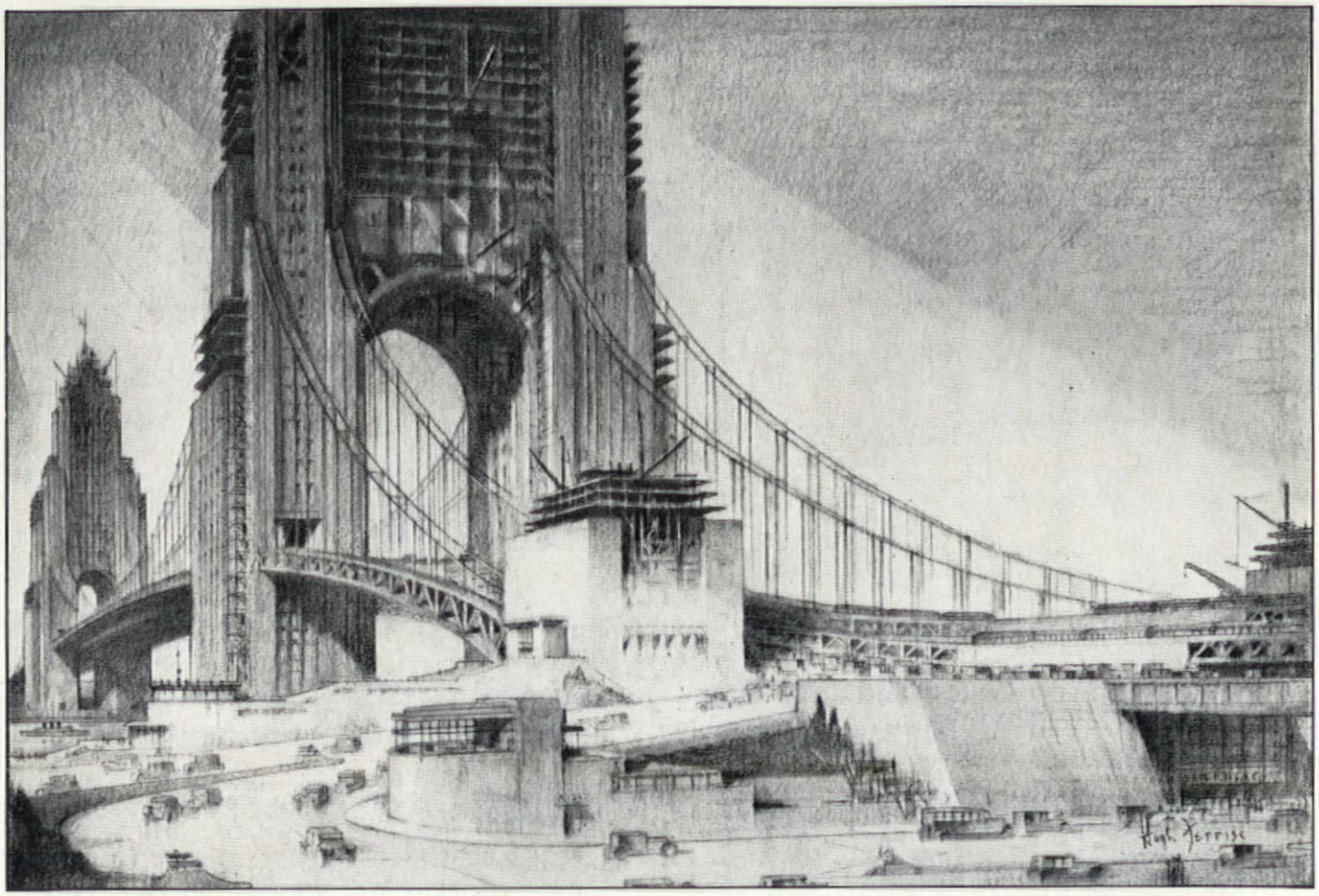
Thus again, just as it has time and time again in the past, American Walnut proves itself the most popular wood in the home by long, long odds. When planning interiors, this avowed preference of American women for real American Walnut is a valuable guide to the architect.

AMERICAN WALNUT

AMERICAN WALNUT MANUFACTURERS' ASS'N—Room 1736 616 S. Michigan Avenue, CHICAGO, ILLINOIS

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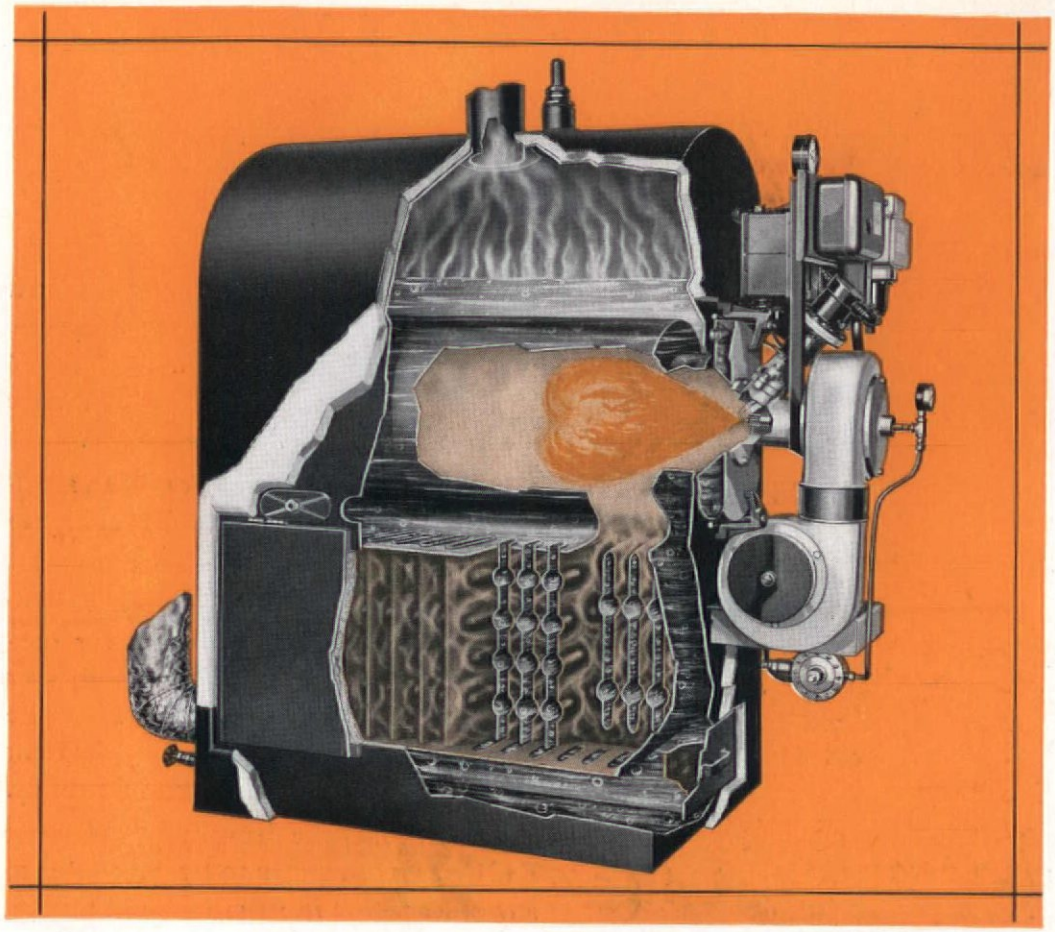
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but still this cypress house is young



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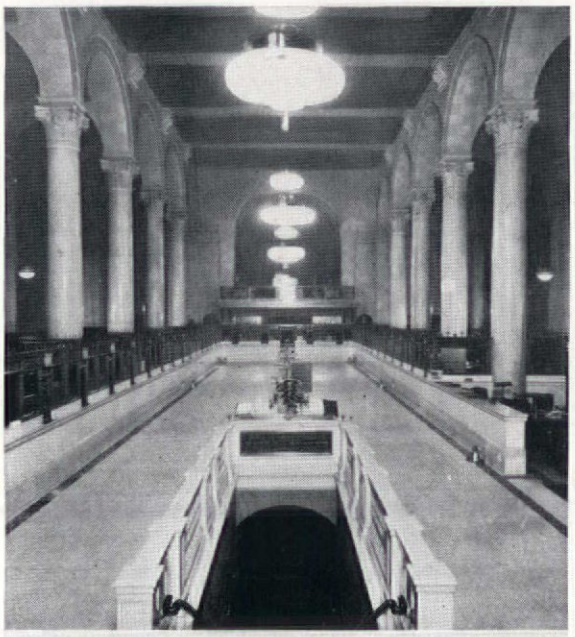
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TIDEWATER RED CYPRESS
(COAST TYPE)
THE WOOD ETERNAL

WIRING FOR PRESENT AND FUTURE DEMANDS

solves bank illumination problems

by R. S. GREGG, A. I. A.

of Hewitt, Emerson & Gregg, Peoria, Illinois



This attractively lighted banking room in the Commercial National Bank of Peoria, Ill. meets today's requirements with a wiring installation that can easily take care of increased future needs.

IN the new Commercial National Bank Building in Peoria, Illinois, the future requirements for electrical service were considered as one of the most important factors in insuring against early obsolescence. On the banking floor greater development in the use of electrical accounting equipment or growth calling for increased personnel was to be expected. On the upper floors, devoted to office space, the probability of new buildings which might encroach on the natural lighting now available had to be taken into account. Subdivisions of a kind that are not needed today are also a possibility. Even without these factors there is a trend toward the use of more light which must be considered.



It seemed logical to look to the local electric service company for information by which to gauge this future demand. Their knowledge of the trend toward the increased use of electricity and their experience with inadequate electric service in buildings only a few years old helped in reaching a practical, reasonable and economic basis for wiring and lighting specifications. The wiring and lighting bureau of the service company co-operated in every part of the electrical layout, supplying advice and information that pointed to the advisability of wiring this 11-story building to supply 4½ watts per square foot on the banking floor and 4 watts per square foot on the office floors. Number 12 circuits are used throughout, and oversized conduit makes it possible to draw an additional circuit into each bay whenever it may be needed.

On the basis of our experience, checked against the information which the lighting service bureau has made available, we feel certain that this building will meet any increased electrical demands that may reasonably be expected during its period of usefulness.

For information about trends in lighting standards and about adequate wiring, call on the wiring bureau of your local electrical service company or write direct.

NATIONAL ELECTRIC LIGHT ASSOCIATION, 420 LEXINGTON AVENUE, NEW YORK



walls without ears

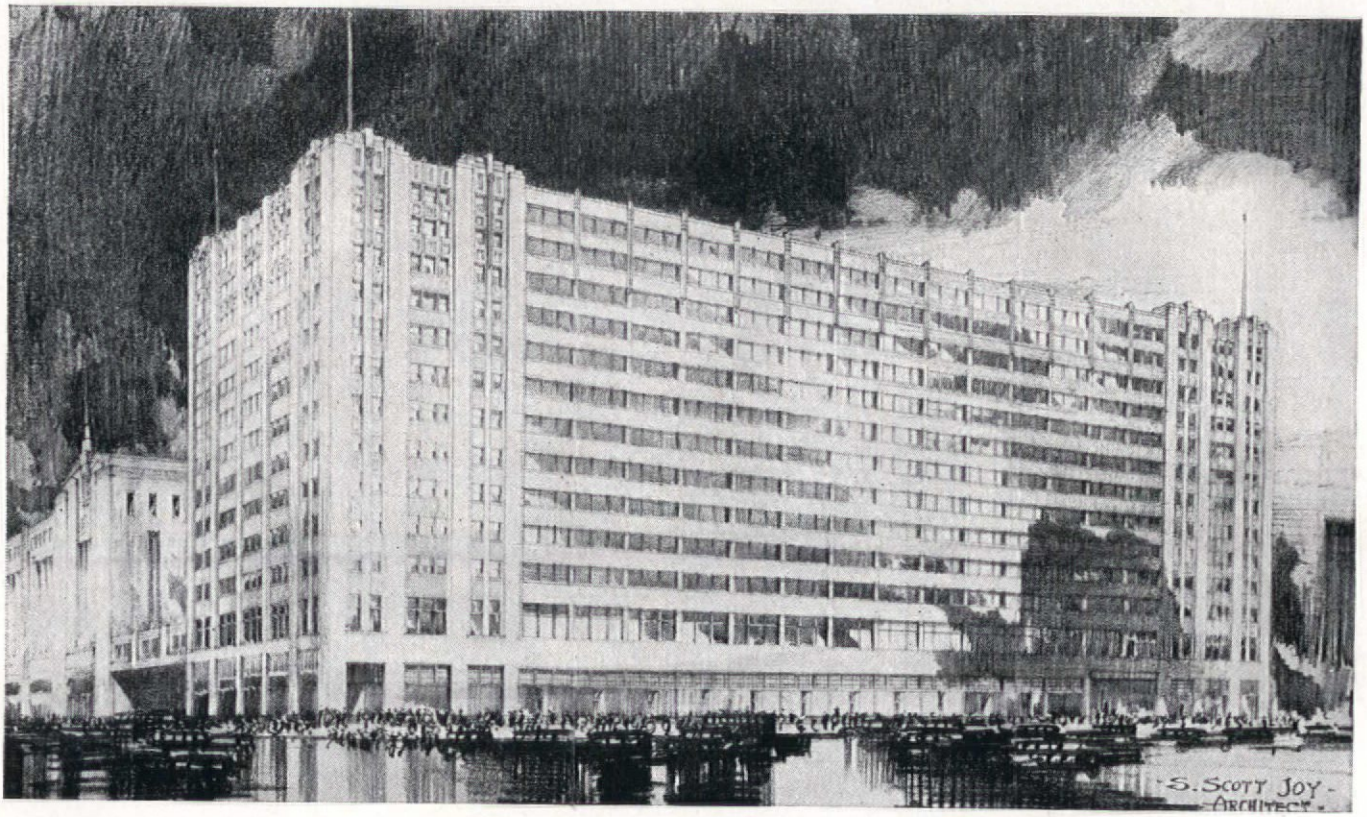
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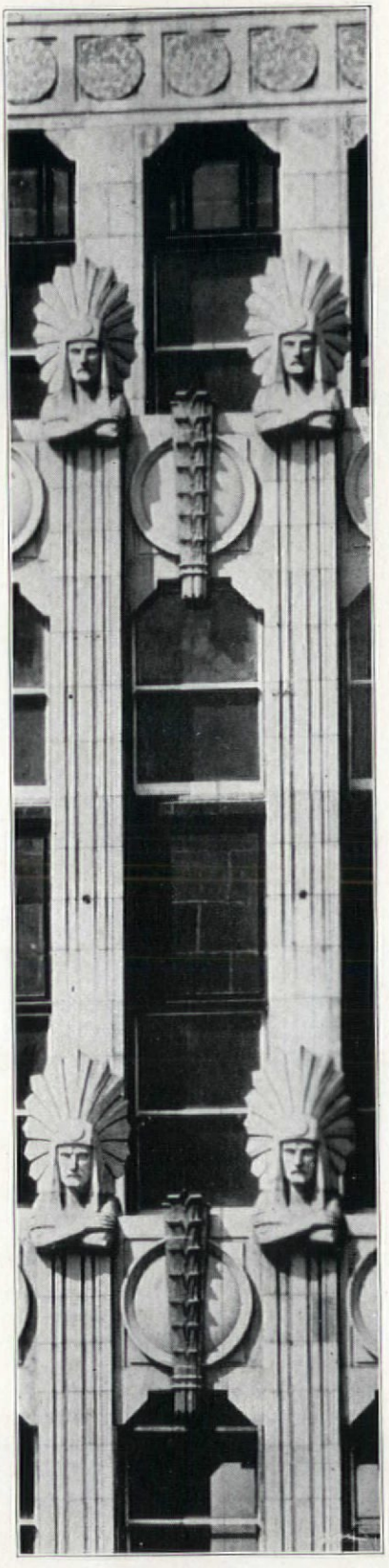
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The architects of the great Merchandise Mart at Chicago, Messrs. Graham, Anderson, Probst and White, solved this problem by the logical use of Northwestern Terra Cotta for enrichment and color. The accompanying illustration shows one of many architectural motifs, executed in Terra Cotta. The colors are warm, even-toned, grey in the general adornments; dark green spandrels and well-placed gold inserts incircling the facades.

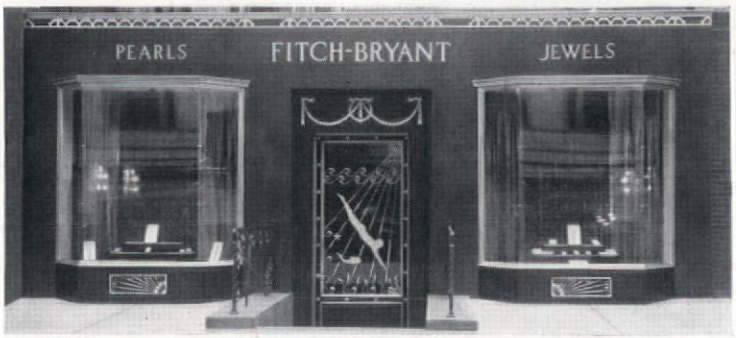
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Fitch-Bryant Store, Boston, Massachusetts. Architect—Clifford Allbright.

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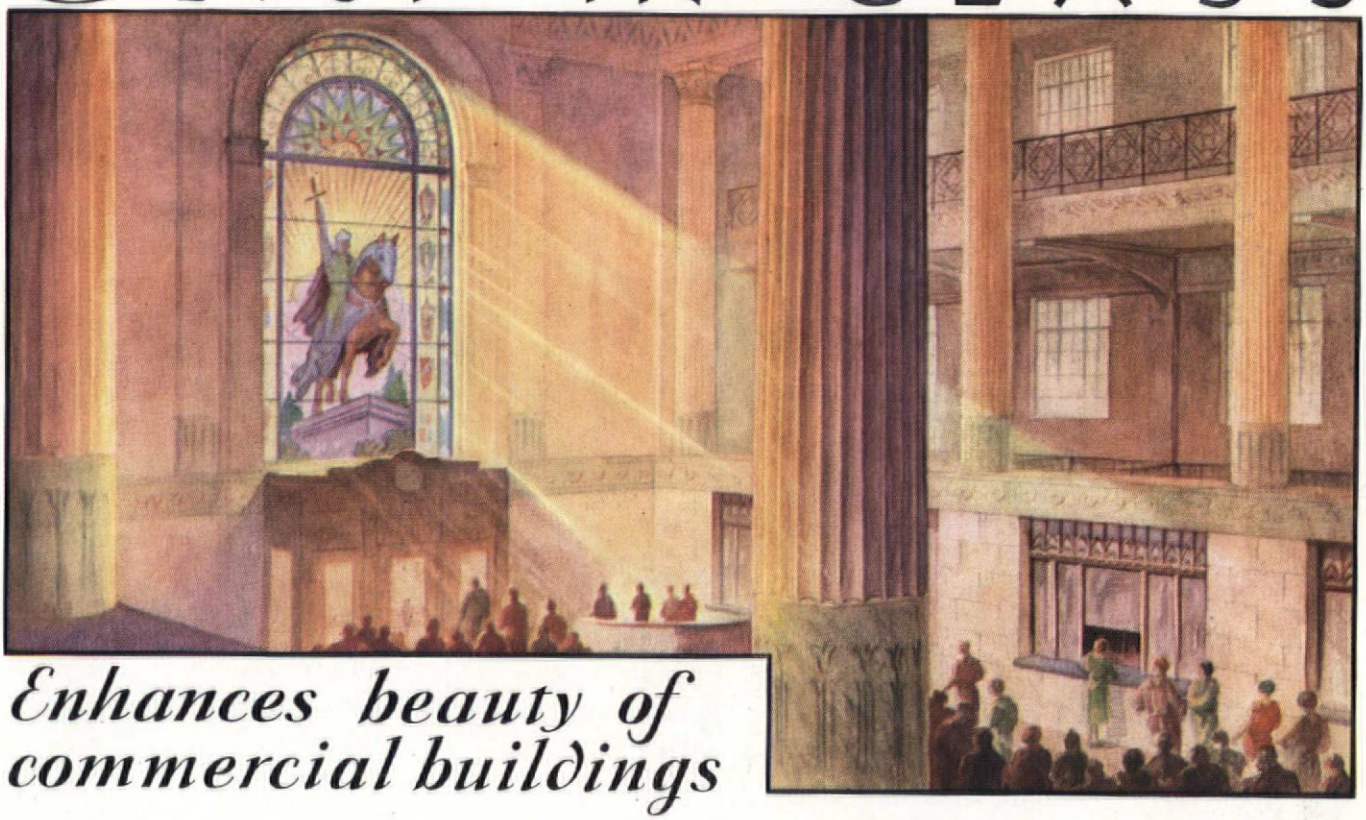


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Because we realize that the demand upon an architect's time in the selection and specification of the various products for a new building, do not warrant his thorough investigation of those materials relatively minor in importance, we have evolved a comprehensive consultation service on steel compartments which is instantly available to you without cost or obligation . . . WEISTEEL compartments, doors and hardware are designed and built by an organization with more than half a century of experience in the field . . . For details of WEISTEEL design and construction, turn to Sweet's, following pages B-2388. A nearby representative will be pleased to discuss with you any special points not covered there.

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Elkhart, Indiana

ART IN GLASS



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At one time it was said that commercialism strangled Art. Today, Commerce is Art's richest patron. In the architecture of the modern business structure we find purity of design that ranks with the finest work of ancient Grecian craftsmen. In business interiors we find furnishings that mark the highest development of the cabinet maker's skill. And in decorative treatments we find, among other things, an ancient art revived—the art which, working with stained glass, transforms cold, raw, glaring light into soft warmth and friendliness. . . .



A window suggestion for a banking institution. Some emblem or historical incident would inspire the illustrative theme. Using glazier's paint on opalescent glass, the beauty of this window would be apparent inside or out . . .

Business has been quick to realize that beauty is an asset and that art and color can be used to create impressions, stimulate clear thinking and mask the drabness of a work-a-day world. When Business calls upon you, the architect, for your suggestions, give Business the cheerful charm that color-in-light imparts. Give Business Art—real Art—in the medium of glass. . . . If you wish, we will supply you with the names of nearby artist-craftsmen who work with glass and who will capably give you their sincere co-operation and worthwhile advice.

KOKOMO
Opalescent Glass Co.
1300 S. MARKET ST., KOKOMO, INDIANA

MANUFACTURERS OF • • OPALESCENT GLASS • • CATHEDRAL GLASS
ANTIQUE GLASS • • STAINED GLASS • • GLASS FOR ART PURPOSES

TURNING PLANS INTO REALITY



WESTERN UNION TELEGRAPH COMPANY BUILDING, NEW YORK

TODAY—the development of American architecture has reached a plane that holds the undivided attention — the admiration and acclaim of the entire world.

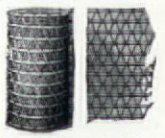
Today—the architect and builder are causing vast edifices to tower more and more toward the sky—to stand as enduring monuments to present standards of design and efficiency of materials.

Today—as in years past—the American Steel and Wire Company is supplying a major portion of the wire fabric (the steel backbone of concrete) that enables plans to be turned into reality.

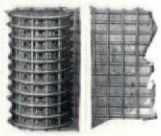
So—we take justifiable pride in the confidence engendered by our products—and extend the full services of our engineering and technical staffs to the solution of specific reinforcement problems. Write to our nearest sales office for information and literature.

WIRE FABRIC

THE STEEL BACKBONE OF CONCRETE



Triangle Mesh Wire Fabric Reinforcement. Furnished in rolls or sheets.



Electric Weld Wire Fabric Reinforcement. Furnished in rolls or sheets.

Western Union Telegraph Company Building, New York, Voorhees, Gmelin & Walker, Architects. Marc Eidlitz & Son, General Contractors. Senn-Herricks Corp., Fireproofing Contractor.

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SUBSIDIARY UNITED STATES STEEL CORPORATION

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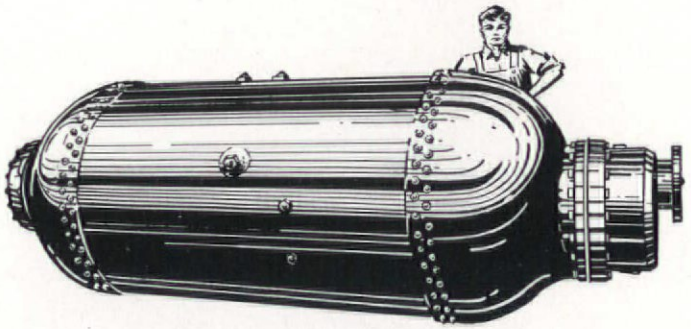
U. S. Steel Products Co.: San Francisco Los Angeles Portland Seattle Honolulu

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SUPER-AQUATHERM
Gas Under Fire





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AUTOMATIC GAS UNIT
with Side Arm

THE Dahlquist line of copper hot water units gives you everything that your clients may require, from the largest heavy copper boiler for industrial purposes to the smallest range boiler for the modest dwelling. Furthermore Dahlquist quality stands supreme with thirty years' reputation for giving the additional value that insures long life, trouble-free service and satisfied customers. It is this extra value which has built the Dahlquist Manufacturing Company from a small one-man business to America's largest manufacturer of copper boilers.



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Dahlquist Copper Superaquatherm Automatic Storage Systems Patented

Are the latest contribution of science to the home hot water supply. They are entirely automatic, use gas or electricity, are fully insulated to avoid heat radiation, and embodying the patented aquatherm principle of water circulation, effect a remarkable economy in fuel bills. In spite of all their advantages, Dahlquist's enormous production results in the lowest prices.

Write for full information.



AUTOMATIC ELECTRIC UNIT



KEROSENE UNIT
Range Boiler

Dahlquist Mfg. Co.

30 West 3rd Street — So. Boston, Mass., U. S. A.

Specify

THORP DOORS

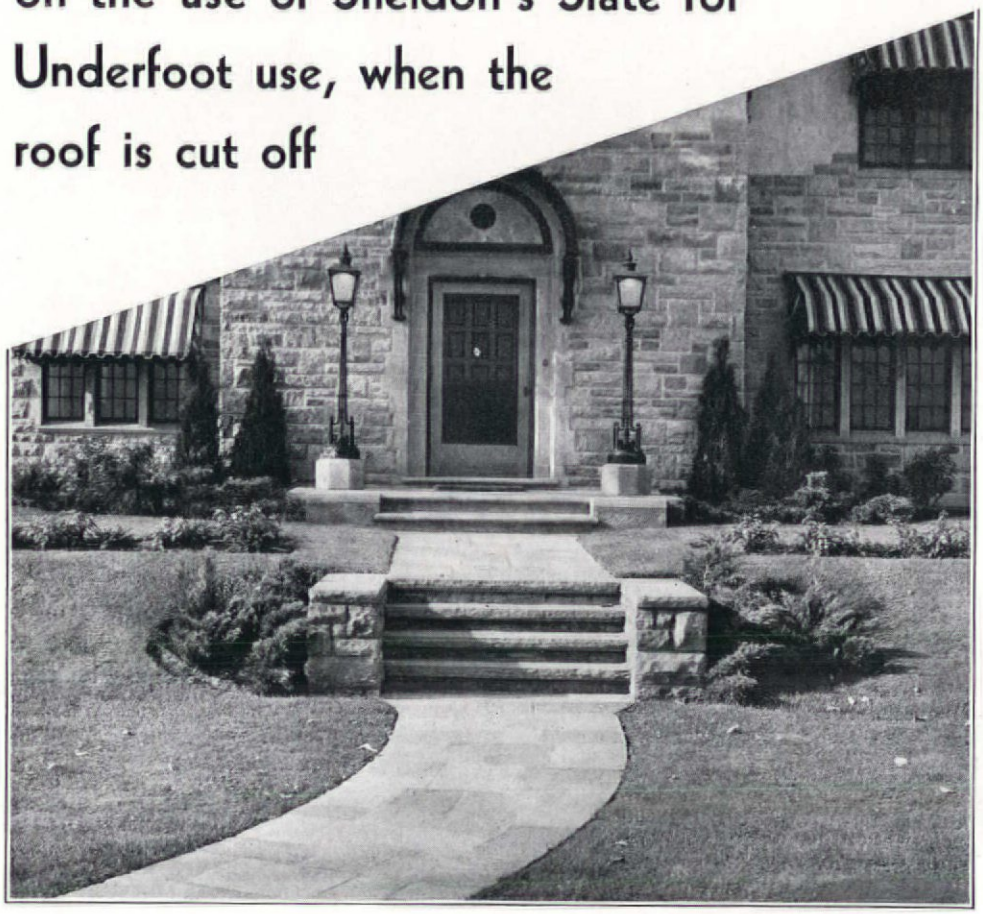


A building's street entrance either brings to a focus the dignity and substance of the whole structure—or it does not. Realizing its importance, Foeller, Schober and Berners, the architects of the new City Center Building at Green Bay, Wisconsin, chose Thorp to execute the entrance following their designs. The grill and push bars are wrought bronze, in a forceful and interesting design. The doors are bronze. Proved methods of construction, early developed and always used by Thorp, insure their giving many years of faultless service.

THORP FIRE PROOF DOOR COMPANY
MINNEAPOLIS . . . MINNESOTA

You get a Better Slant

on the use of Sheldon's Slate for Underfoot use, when the roof is cut off



The Architect handling good projects can not forget that Sheldon's is "The Roof of Eternal Beauty."

But the many other uses of Sheldon's Colored Slates are not so spontaneously thought of; and so we have deliberately mutilated the photograph of the C. M. Day residence, Jackson, Michigan (Beckett & Akitt, Detroit, Architects) to call attention more forcibly to the walk. Imagine its colors: Sheldon's light and dark unfading greens, weathering greens and grays, clear and mottled purples, with an intelligent scattering of brown pheasants and Arabian reds.

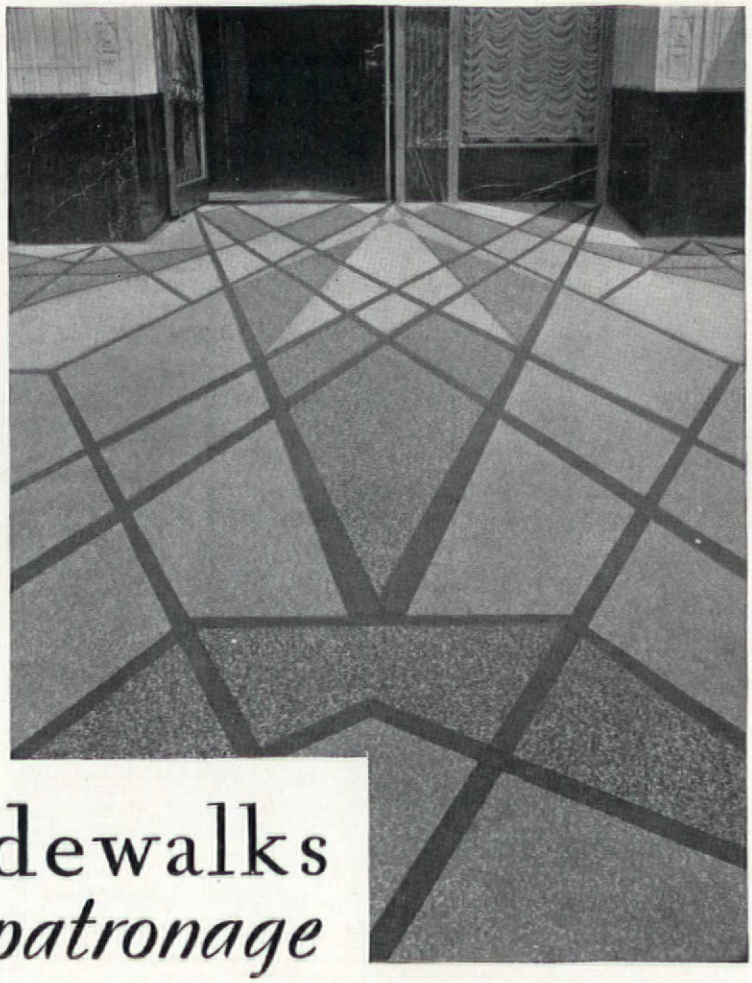
Note particularly that Sheldon's slates, in these colors, were used also, in random rectangular and semi-irregular patterns, for the front, side, and rear terraces, the stag-room hearth, the upper garden walk, the pergola floor, and the floor and coping of the basin.

Look in Sweet's for four Sheldon Slate Roofs in natural colors; but in any event permit us to help you utilize these slates for other purposes to which they can contribute unusual, distinctive beauty.

F.C. SHELDON SLATE CO.

GENERAL OFFICES · GRANVILLE · N·Y·

· BRANCHES IN PRINCIPAL CITIES ·

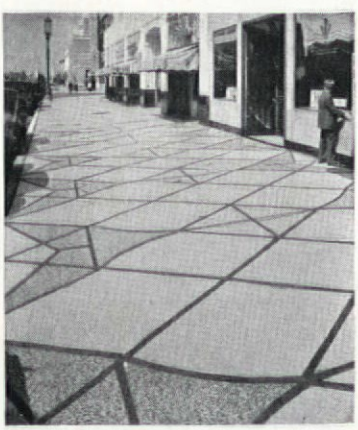


Portland cement concrete sidewalks surrounding the Wilshire Professional Building, Los Angeles. Arthur E. Harvey, Los Angeles, Architect.

Sidewalks *which invite patronage*

Sidewalks are playing a new role. They are helping business set the stage for sales, by providing an attractive approach to the shops they border. The patterns illustrated on this page were carried out in terrazzo, one of the specially finished forms of portland cement concrete. The result is really an extension of the lobby floors to the pedestrian area outside — an invitation to enter the building and its shops.

Each day concrete assumes new importance in the realm of business. Its fire-safety affords protection alike to lives and property. It contributes a substantial and enduring beauty to the architecture of smart shop and towering department store. It helps create favorable comment. In building and surroundings, *concrete sets a magnificent stage for sales!*



Sidewalk patterns—new and different—may be produced at somewhat less expense than the fine terrazzo here pictured, by mixing suitable mineral colors in the concrete.

PORTLAND CEMENT *Association*

Concrete for Permanence and Firesafety

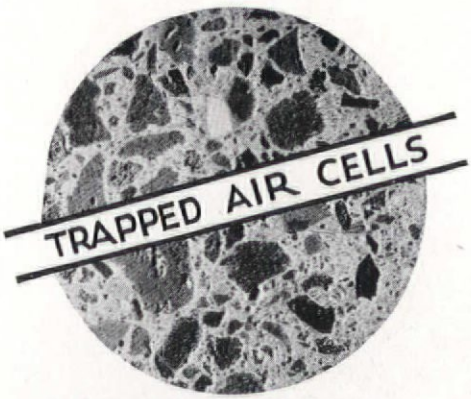
33 WEST GRAND AVENUE
CHICAGO

The 10 POUND *Precast Roof Deck*

is made of HAYDITE CONCRETE—the material whose unique structure of trapped air cells provides strong, light, insulating roof slabs which go on the same light steel frame that carries other roofs.

Featherweight slabs produce the lowest cost permanent roof available today—they are fireproof and free of all maintenance expense. Millions of square feet are in use by the country's leading industrials, railroads and public buildings. "Catalog and Roof Standards" on request.

Featherweight Concrete INSULATING ROOF SLABS



Note the cellular nature of Featherweight concrete which makes it light and insulating, yet with concrete's standard strength and density.

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FEDERAL CEMENT TILE COMPANY

608 South Dearborn Street Chicago

FOR OVER A QUARTER CENTURY

In Cleveland's Great

CLEVELAND UNION TERMINAL BUILDINGS
Cleveland, Ohio

Architects:
Graham, Anderson, Probst & White,
Chicago, Ill.

General Contractors:
Lundoff — Bicknell Company, Cleveland, Ohio
John Gill & Sons, Cleveland, Ohio
Aronberg-Fried Company, Cleveland, Ohio

Chief Engineer:
H. D. Jouett, Cleveland, Ohio



Among the materials used in this construction were the following products from Subsidiary Manufacturing Companies of the United States Steel Corporation:

American Bridge Company
Fabricated Structural Steel Work for buildings and viaducts.

American Sheet and Tin Plate Co.
Apollo Galvanized Sheets.

American Steel & Wire Company
Wire Rope, Wire Fabric Reinforcement, Nails, Rail Bonds, Wire Strand, Electrical Wires and Cables.

Carnegie Steel Company
Carnegie Beams, Structural Materials, Rails.

Cyclone Fence Company
Copper-Steel Chain Link Fence and Pipe Railing.

Illinois Steel Company
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The Lorain Steel Company
Cast Steel Foundation Plates.

National Tube Company
National Pipe and Conduit.

Universal Atlas Cement Company
Universal and Atlas Cement.
Atlas White Portland Cement

Terminal Project

The magnificent Cleveland Terminal—one of the outstanding construction projects of recent years—affords an excellent opportunity to visualize the complete service offered by one of America's leading industrial organizations. From the massive foundations to the pinnacle of the central tower, the products of the principal Subsidiary Manufacturing Companies of the United States Steel Corporation serve in some important capacity. Not only the main buildings and foundations, but the ramps, viaducts, paving, tracks, conduits, approaches and enclosures—all required the extensive use of Steel and Concrete.

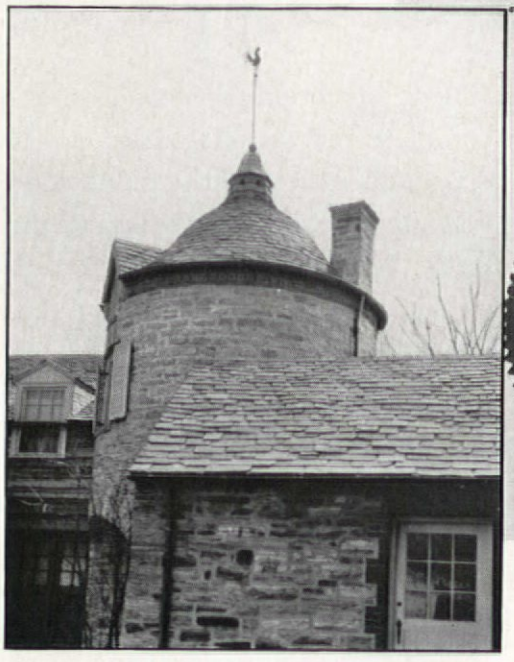
Just as a close cooperation and organization of working forces has been necessary to erect this splendid project, so a closely coordinated organization, working hand in hand in mutual giving and taking of practical experience and manufacturing ability, has furnished products essential to its construction. Future years of long life and satisfactory service will demonstrate the many benefits to be derived from using, wherever possible, products from one source of supply, where the factor of quality and service has been the keynote of production.

Principal Subsidiary Manufacturing Companies of the UNITED STATES STEEL CORPORATION

AMERICAN BRIDGE COMPANY
AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY
CYCLONE FENCE COMPANY
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MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
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TENNESSEE COAL, IRON & R. R. COMPANY
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Telephone ASHland 3651

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*CELL*ized* wood floor blocks

for homes, apartment hotels, dining and ball rooms, clubs, churches, hospitals, showrooms, banks, schools and public buildings generally.



*CELLized Oak blocks in a Nurses' residence, Hospital for Consumptives, Mt. Dennis, Ontario, Can. Architect, Raymond Collinge—Flooring Contractor, R. Laidlaw Lumber Co., Toronto.



The strong color contrasts in this floor are obtainable in "lower" grade blocks only

11¼" Quartered White Oak blocks in the Bank of Commerce, Memphis, Tenn. Hanker and Cairns, Architects. Superior Floor and Screen Co., Floor Contractors.



The Wetherby-Kayser Shoe Co. at Pasadena, California. 9" Oak blocks. A. B. Slack, owner.

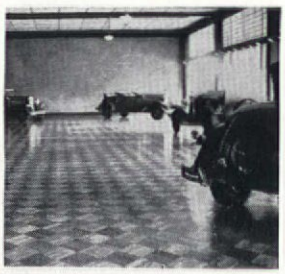
STYLE in floors, not only for homes, but for all types of interiors where wood floors have not heretofore been considered desirable or economical, is possible through the economy and versatility of the *CELL*ized* unit wood block. Beauty, durability, and inexpensive upkeep are combined with low cost.

NEW— Architects are invited to visit the *CELL*ized* office display in Memphis. Combinations of woods, both squares and rectangles, are installed in floors, walls and ceilings. These offices in actual use illustrate the wide application of unit blocks under service conditions.

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FLOORING—Shall be ..... " *CELL*ized* ..... Blocks, laid according to *CELL*ized* specifications over ..... subfloor, by a Licensed Floor Contractor. Delivery of the *CELL*ized* Oak Flooring Inc. 5 year guarantee by the contractor will be required upon completion of the job.

OAK	BEECH	MAPLE	RED GUM	WALNUT	PHILIPPINE MAHOGANY	MAPLE*
Rectangular blocks in two sizes, 6" x 12" and 6¾" x 13½" Square blocks, 13-16" thickness in the following sizes:						
6¼ in.	6¾ in.	6¼ in.	*for walls*	6¼ in.	6¼ in.	*also in*
7½ in.	7½ in.	8 in.	*and ceilings*			*1 1-16" thickness in the following sizes:*
9 in.	9 in.	9 in.	6¼ in.	9 in.	9 in.	
		9¾ in.	9 in.			
10½ in.		10 in.				6¼ in.
11¼ in.	11¼ in.	11¼ in.	11¼ in.	11¼ in.	11¼ in.	9 in.
12 in.	12 in.	12 in.				
		13 in.				

*For industrial floors, maple blocks are also fabricated 1 5-16" thick; several sizes.



LICENSED — *CELLized Oak Flooring INC. — MEMPHIS TENNESSEE — FLOORING CONTRACTOR

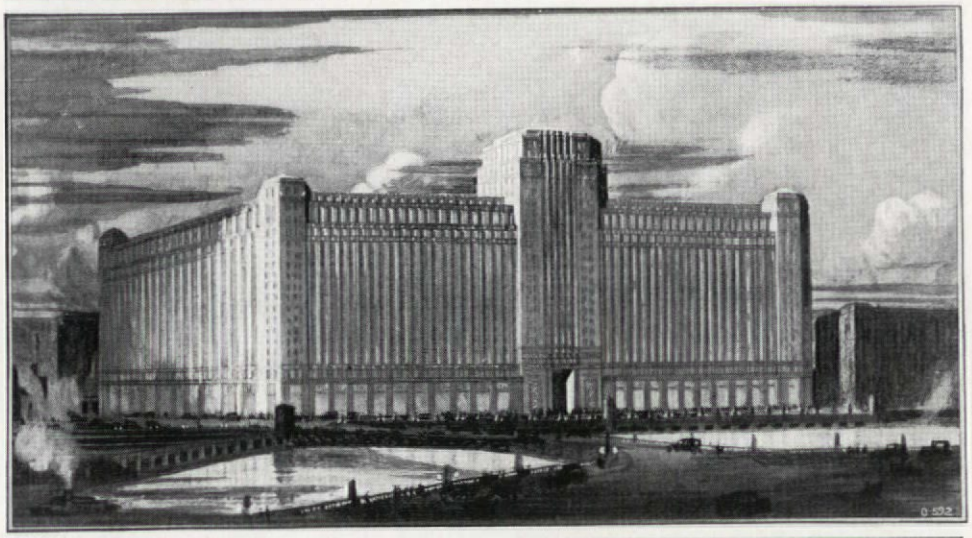
*CELLized Wood Floor Blocks are guaranteed. Laid only by Licensed Flooring Contractors.

*CELL*ized Oak Flooring Inc.*

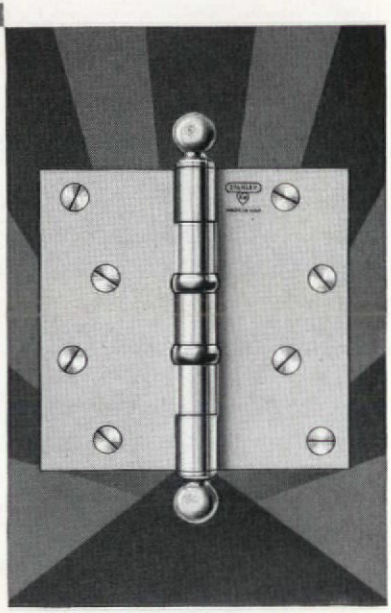
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E. L. BRUCE COMPANY . . . . Memphis, Tenn. NASHVILLE HDW. FLOORING CO., Nashville, Tenn.



STANLEY
S.W.



PERMANENCY

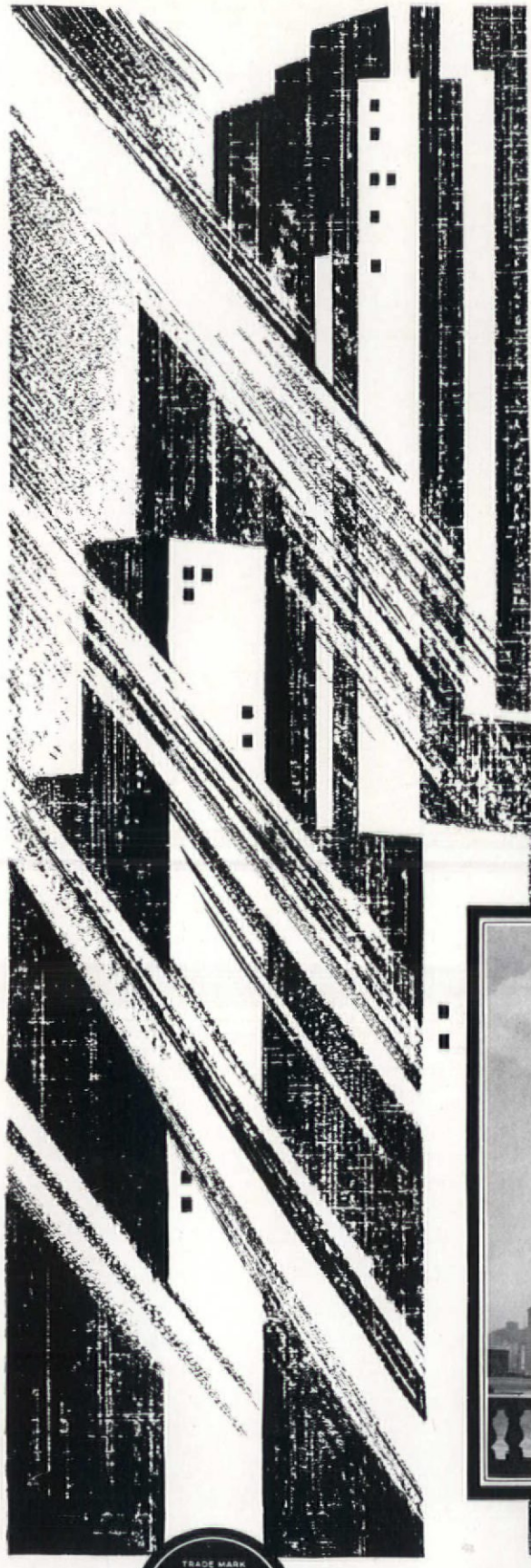
STANLEY Ball Bearing Hinges swing more than 2000 doors in the Chicago Merchandise Mart.

Architects, Graham - Anderson - Probst and White, have spared no effort to produce a building which will be a source of satisfaction to occupants for years to come. To assure smooth, trouble - free operation of the doors for the life of the building, Stanley Ball Bearing Hinges were used.

STANLEY BALL BEARING HINGES

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THE STANLEY WORKS
New Britain, Conn.



AMONG the prominent buildings gracing Chicago's famed Michigan Boulevard, as seen from the monumental peristyle, Grant Park, are several typical structures which furnish proof of the inherent excellence of Pratt & Lambert products as interior finishes.

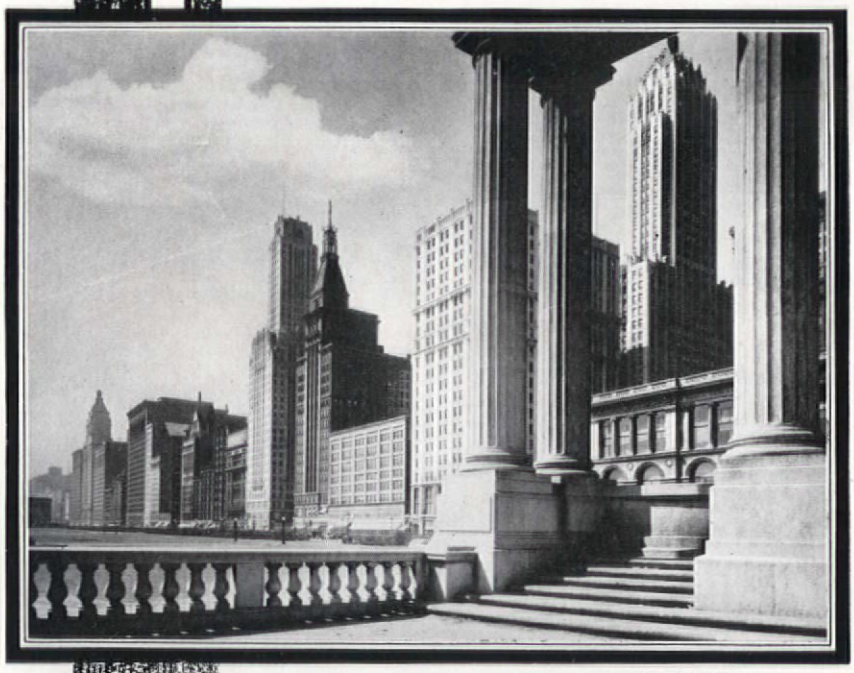
Two outstanding examples are furnished by the recently erected Willoughby Tower (approximate center) on the interior trim of which "38" Preservative Varnish was used, and the new Pittsfield Building (extreme right between columns) where Vitraloid Lacquer was used on the interior trim.

"38" Preservative Varnish, in its natural high, rich gloss or rubbed to a satiny dull finish, enhances any wood surface. Vitraloid Lacquer, Clear Gloss and Dull Finish, meets today's demand for speedy finishing of a large project with a durable, instantly-dry material.

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MICHIGAN BOULEVARD, CHICAGO, AS SEEN FROM THE MONUMENTAL PERISTYLE, AT NORTH END OF GRANT PARK

TRADE MARK P&L REG U S PAT OFF

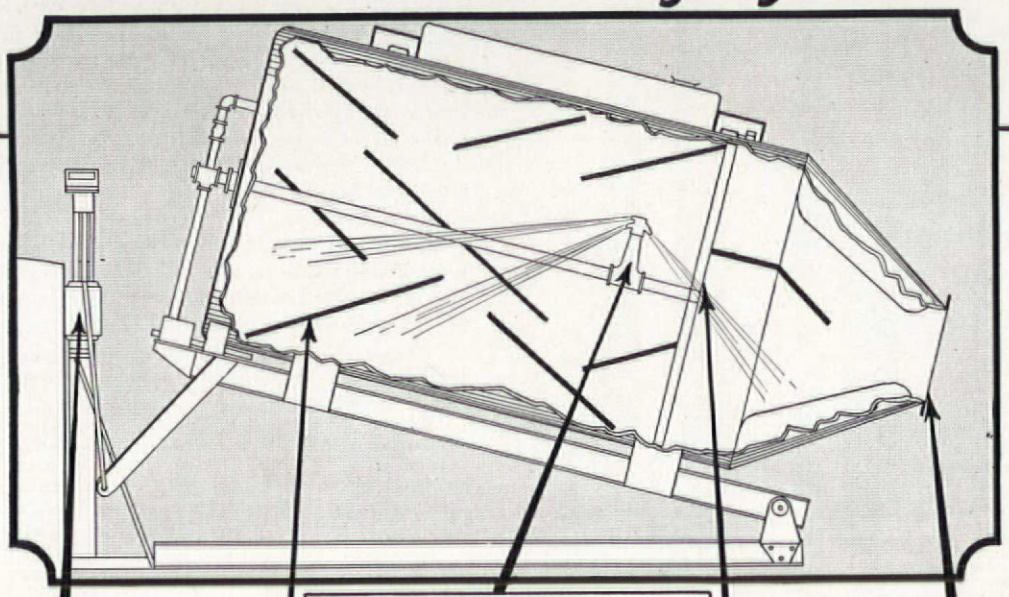
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Scientifically designed to mix and deliver concrete without segregation



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A time-tested and proven feature used entirely for elevating and discharging mixer. Discharging operation requires no assistance from mixing blades, therefore permitting continuous mixing during discharge.

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High level water discharge under pressure combines ability to carry large loads in proportion to size of mixer, perfect distribution of water and cleansing action after discharging.

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The scientific arrangement of blades in transit mixers is an important feature. The blades in Paris TRANSIT Mixers are designed solely for mixing and are not required to aid discharging.

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Are another important structural feature affording rigid support to water line and roller tracks, thereby providing the necessary strength for the exceedingly large pay loads carried without adding excessive weight.

PARIS TRANSIT MIXERS

All of the above features are built around and made possible by the use of the hoist. Large loads cannot be introduced nor the full capacity of the mixer used by an arrangement of blades alone. "A full barrel rolls easiest." The same principle applies to a mixer. Paris TRANSIT Mixers, using these fundamental laws of mechanics, are unequaled for economy of operation and size of pay load.

"PROFIT FROM EXPERIENCE"



TRANSIT MIXERS, Inc.

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All unnoticed perhaps, aluminum, which means "pots and pans" to most of us, has come a long way since it was first used in architectural design forty-six years ago. Today, as an architect, you can specify—and one, or several, of 177 leading manufacturers will fill your order for—Alcoa Aluminum Conduo Base, Mop-strip, Casement and Sash, Kick Plates, Hinges, Ball Bearing Butts, Rolling Doors, Lamp Standards and Brackets, Radiators, Screen Frames, Shingles, Hollow Doors and Trim — these and perhaps a score more building products.

Here are forty-five ways

Balustrades	Entrances	Marquises	Risers	Spandrels
Columns	Fascias	Newels	Saddles	Stair Railings
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Cornices	Gratings	Partitions	Scuppers	Store Facing
Cresting	Gutters	Pendants	Sheet Roofing	Treads
Doors	Lamp Standards	Pilasters	Shingles	Ventilators
Door Hardware	Lighting Fixtures	Radiators	Sills	Weather Strip
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Here are the 177 Leading Manufacturers who regularly fabricate Alcoa Aluminum Building Products and Specialties

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Aluminum ventilators

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Alexander-Johns Co.
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Skylights

Allith-Prouty Company
Danville, Ill.
Airport door hardware
Warehouse door hardware

American Abrasive Metals Co.
New York, N. Y.
Safety door saddles
Safety elevator door sills
Safety stair treads

American Iron and Wire Works
Chicago, Ill.
Architectural metal fabricators

American Sheet Metal Works
New Orleans, La.
Sheet aluminum architectural products

American Skylight Co.
Chicago, Ill.
Ventilating skylights

American Mason Safety Tread Co.
Lowell, Mass.
Aluminum step plates
Stair treads
Nosing

American 3-Way Luxfer Prism Co.
Cicero, Ill.
Sidewalk, roof & transom lights
Ventilators

American Warming & Ventilating Co., The
Toledo, Ohio
Louvers & screens
Sidewalk grilles
Mixing louvers & by-pass dampers
Back pressure dampers

Anco Mfg. Co.
Chicago, Ill.
Store fronts

Art Metal Construction Co.
Jamestown, N. Y.
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Atchison Revolving Door Co.
Independence, Kans.
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New York, N. Y.
Decorative & architectural aluminum
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Becker Co., Geo. H.
New York, N. Y.
Architectural aluminum

Blaski Manufacturing Co.
Chicago, Ill.
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Bliss Steel Products Corp.
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Office windows

Blum & Co., Inc., Julius
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Chapman Co., Inc., Wm. O.
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Decorative & architectural aluminum

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Chicago, Ill.
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Corbin, P. & F.
New Britain, Conn.
Locks & Builders' hardware

Cox, Nostrand & Gunnison
Brooklyn, N. Y.
Lighting fixtures

Crescent Steel Co.
St. Louis, Mo.
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Factory sash

Crown Iron Works
Minneapolis, Minn.
Architectural aluminum

Cutler Mail Chute Co.
Rochester, N. Y.
Mail chute equipment for office, hotel, apartment & public buildings

Dahlstrom Metallic Door Co.
Jamestown, N. Y.
Elevator entrances
Hollow metal doors & trim
Mop strip
Conduo base

Detroit Show Case Company
Detroit, Mich.
Store front moldings
Hollow metal moldings

Eagle-Heath Bronze Corp., The
Mount Vernon, N. Y.
Decorative & architectural aluminum

Edwards Co., The O. M.
Syracuse, N. Y.
Counters
Cases
Desks
Vault equipment
Document files of aluminum

Ellison Bronze Co., Inc.
Jamestown, N. Y.
Decorative & architectural aluminum

Empire City Iron Works
Long Island City, N. Y.
Anything in ornamental or architectural cast, wrought or extruded aluminum

Empire Fireproof Door Co.
New York, N. Y.
Reinforced extruded aluminum doors

Estey Bros. Co., Inc.
Brooklyn, N. Y.
Decorative & architectural aluminum

Fells, Lent, Cantor & Katz
Long Island City, N. Y.
Store fronts
Extruded aluminum doors

Ferro-Co Corporation
Brooklyn, N. Y.
Miscellaneous products designed & built to order

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Rochester, N. Y.
Architectural & decorative aluminum for all purposes

Friedley-Voshardt Co.
Chicago, Ill.
Sheet metal ornamental stampings

Garrison Bronze Corp.
Chicago, Ill.
Ornamental store fronts
Bank fixtures

General Bronze Corp.
Minneapolis, Minn.
Architectural aluminum

Globe Wire & Iron Works
Milwaukee, Wis.
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Bank doors
Interior grilles

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Brooklyn, N. Y.
Ornamental castings, spandrels, desks, doors, casement windows

Hansell-Elcock Company
Chicago, Ill.
Architectural metal fabricators

The Harrington & King Perforating Co.
Chicago, Ill.
Grilles & ventilators of perforated aluminum

Harsch Bronze & Foundry Co., John
Cleveland, Ohio
Ornamental parts
Extruded store fronts & doors

Hasselman and Salterini, Inc.
New York, N. Y.
Decorative & architectural aluminum

Hauenstein & Burmeister, Inc.
Minneapolis, Minn.
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Hauserman Co., E. F.
Cleveland, Ohio
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Brooklyn, N. Y.
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Doors
Air ducts
Clothes chutes

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Anderson, Ind.
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Himmel Brothers Company
New Haven, Conn.
Rolled & extruded Store fronts & doors

Hirschman Co., Inc., W. F.
Buffalo, N. Y.
Roof ventilators

Hope & Sons, Inc., Henry
New York, N. Y.
Casements
Windows

Hunger Brass Co., H. J.
Cleveland, Ohio
Toilet partition hardware for marble

Ilg Electric Ventilating Co.
Chicago, Ill.
Ventilating Systems

Imperial Brass Mfg. Co.
Chicago, Ill.
Building hardware

International Casement Co., Inc.
Jamestown, N. Y.
Casements
Windows
Hollow metal window frames & Spandrels

Intervale Iron Works, Inc.
New York, N. Y.
Miscellaneous architectural aluminum

Ionia Ventilator Co., Inc.
Philadelphia, Pa.
Ventilators

Irving Iron Works Company
Long Island City, N. Y.
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Dining car kitchen floor mats

Ivanhoe Division of the Miller Company
Cleveland, Ohio
Aluminum lighting equipment
Vapor proof equipment

Jackson Company, Wm. H.
Brooklyn, N. Y.
Decorative & architectural aluminum

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Jamestown, N. Y.
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Hollow metal doors

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Jamestown, N. Y.
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Window, door, porch & roll screens

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Detroit, Mich.
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Chicago, Ill.
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Elevator doors

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New York, N. Y.
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New York, N. Y.
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Grilles

Kawneer Company, The
Niles, Mich.
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"Sealair" in-swinging windows
Store fronts

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Chicago, Ill.
Ventilators

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New York, N. Y.
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Awning outrigger equipment

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Chicago, Ill.
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Conduo base, Mop strip

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Camden, N. J.
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Des Plaines, Ill.
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Sash operating apparatus
Sludge beds

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Casements
Sash windows

Lupton Sons & Co., David
Philadelphia, Pa.
Casements
Sash
Commercial doors

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Canton, Ohio
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Manhattan Perforated Metal Co., Inc.
Long Island City, N. Y.
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Cleveland, Ohio
Meriden, Conn.
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Miller & Doing
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Ornamental sheet stampings

Mills Company, Incorporated, The
Cleveland, Ohio
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Ventilators
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Sash of every description

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Detroit, Mich.
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Mutual Metal Mfg. Co.
Chicago, Ill.
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National Regulator Co.
Chicago, Ill.
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Moline, Ill.
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"Hijet" unit heaters
"Univent" & "Volu-Vent" ventilators

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Railings

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Pneumatic conveyors

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Philadelphia, Pa.
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Philadelphia Metal Stamping Co.
Camden, N. J.
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Tulsa, Okla.
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Pyle-National Company
Chicago, Ill.
Floodlights

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Maspeth, N. Y.
Windows
Casements
Sash

Riesner, Inc., Benjamin
New York, N. Y.
Sheet roofing
Louvers

Rixson Co., Oscar C.
Chicago, Ill.
Door hardware

Robertson Company, H. H.
Pittsburgh, Pa.
Sash
Skylights
Smoke jacks
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Sargent & Company
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Schaeffer Company, The
Chicago, Ill.
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Schreiber & Sons Company, The L.
Cincinnati, Ohio
Aluminum sand casting work
Extruded aluminum shapes

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Long Island City, N. Y.
Decorative & architectural aluminum

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Ornamental & architectural aluminum

Shean Steel Window Co.
Chicago, Ill.
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Ornamental metal

Smyser Royer Company
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Ornamental & architectural aluminum

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Southwestern Ornamental Iron Company
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Decorative & architectural aluminum

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Unit heaters

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Cleveland, Ohio
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Ornamental parts
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Canton, Ohio
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Conduo base

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Elevator fronts

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Hollow metal doors

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Wakefield Brass Co., The F. W.
Vermilion, Ohio
Commercial lighting fixtures
Miscellaneous reflectors

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Lighting fixtures
Ornamental aluminum

Warren & Co., Walter G.
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Lighting fixtures

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Chicago, Ill.
Passenger & freight elevators

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Architectural metal fabricators

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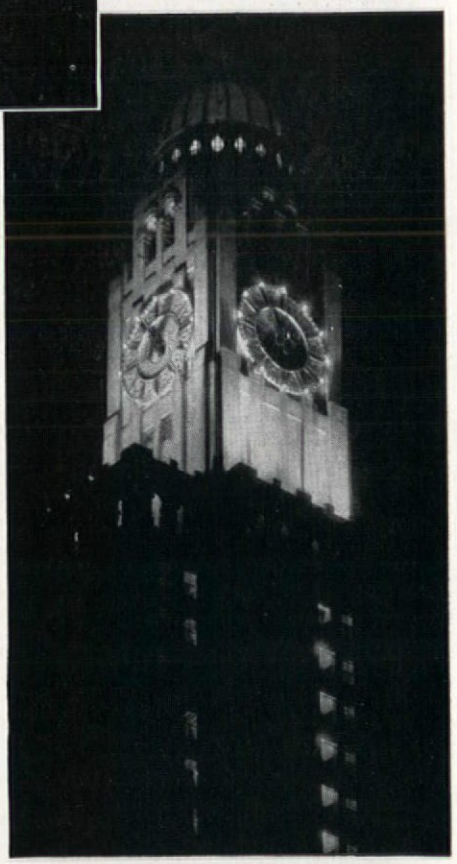
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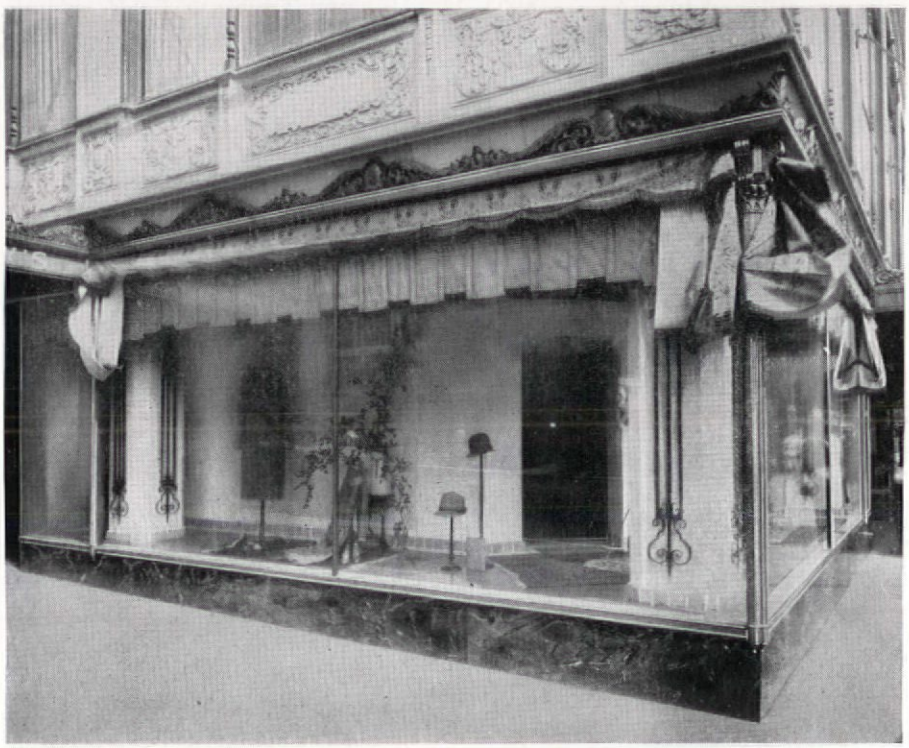
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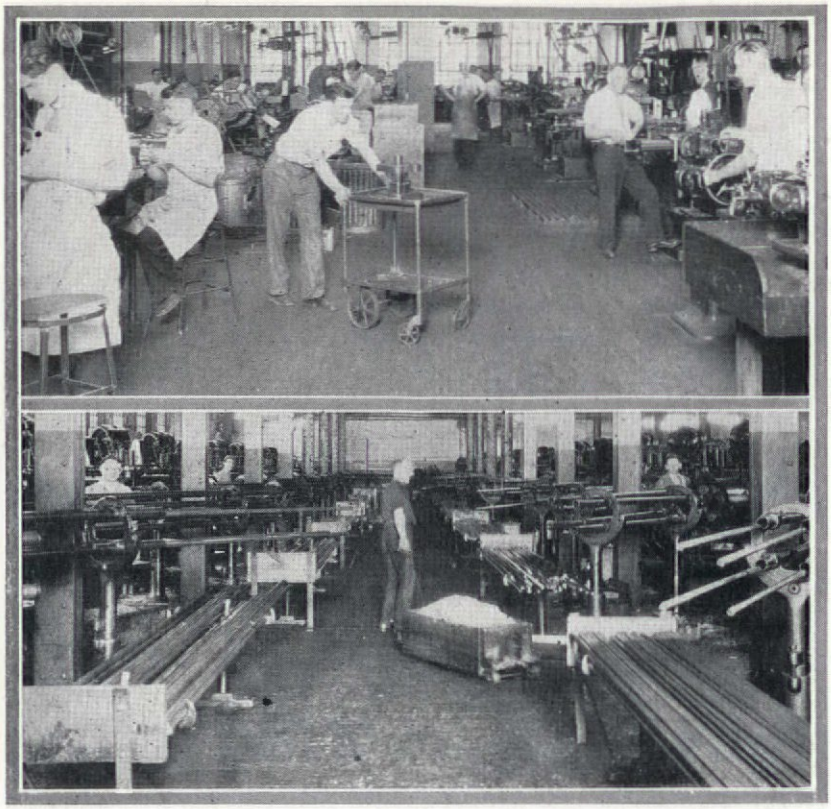


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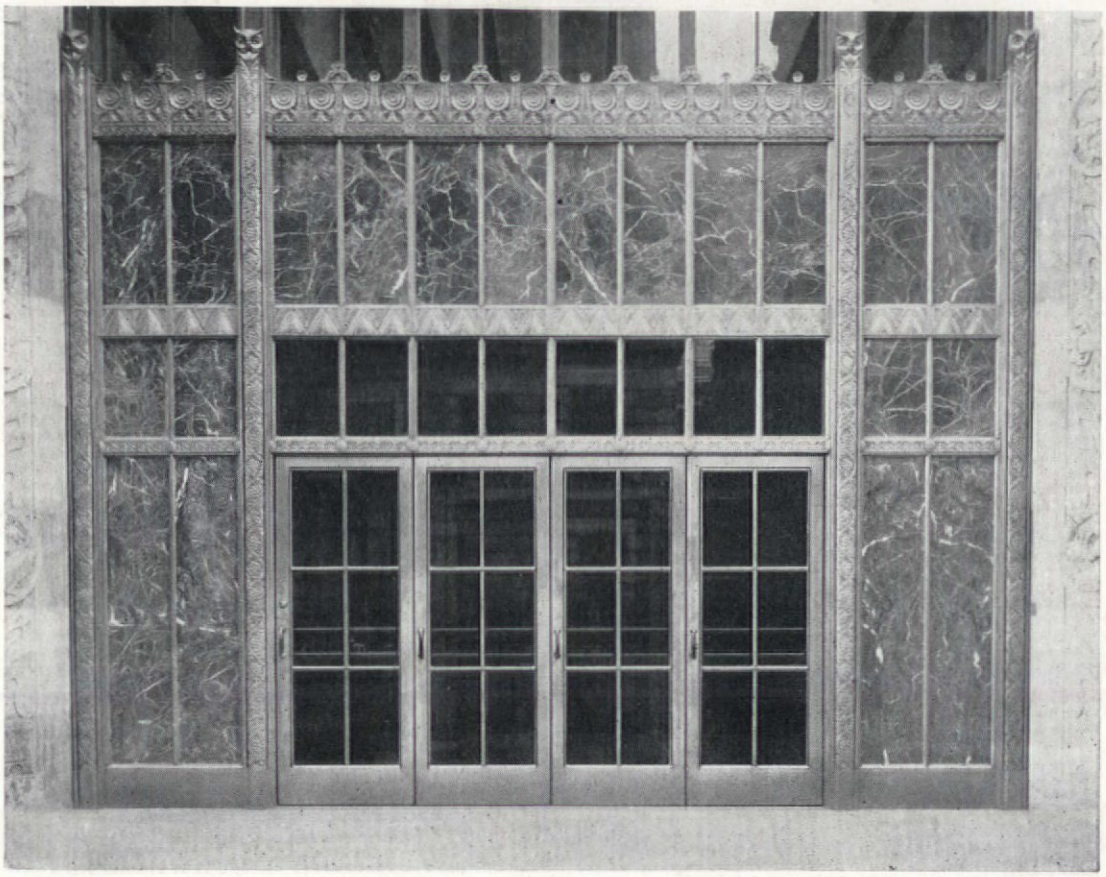
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ENTRANCE

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ELLISON
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BRONZE DOORS

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twenty-six of
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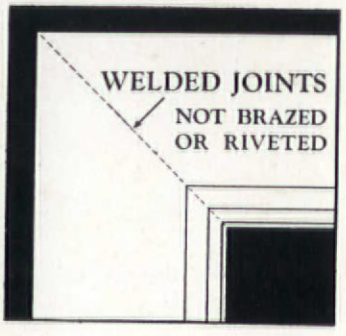
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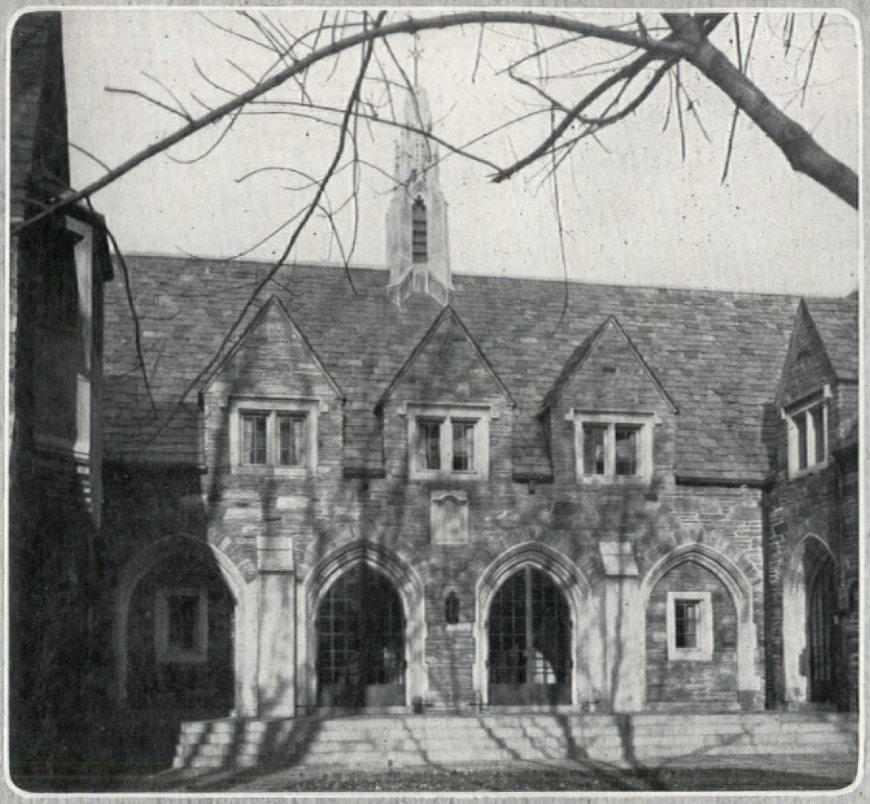
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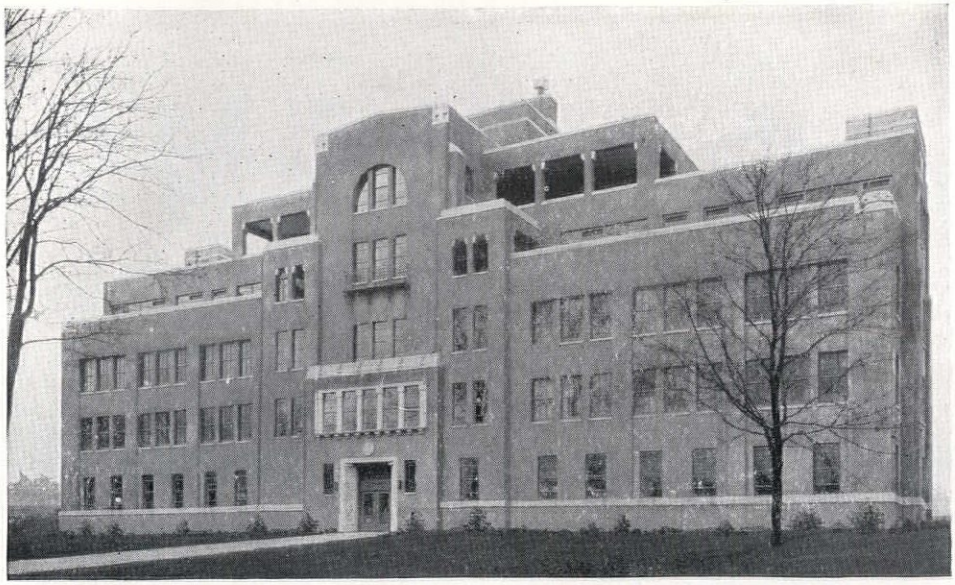
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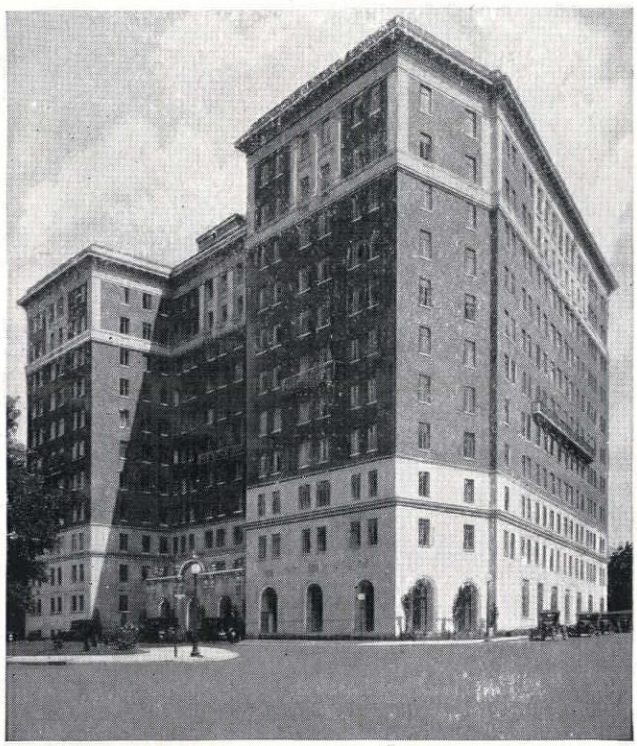
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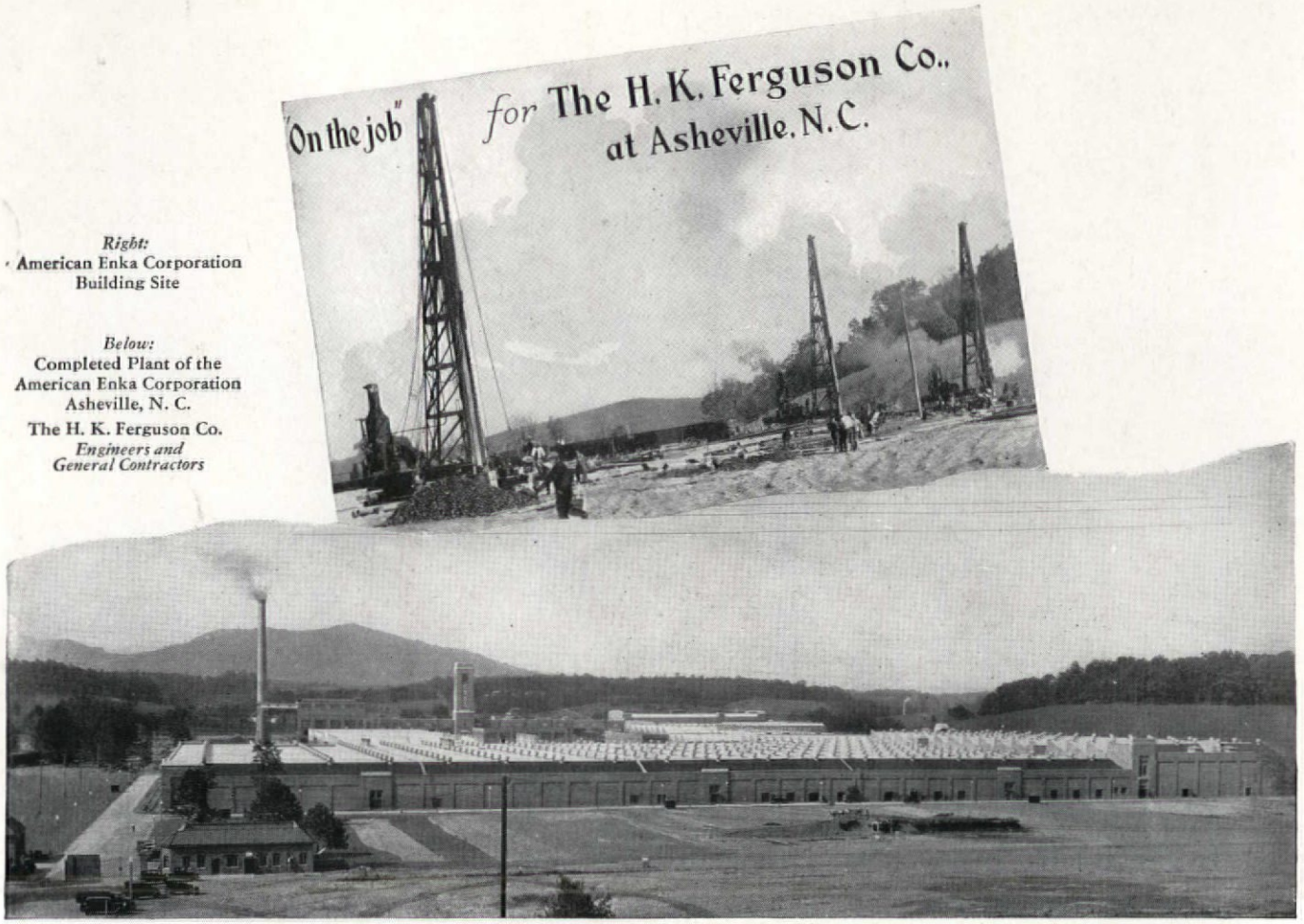
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Next, the driving of 3,481 MacArthur compressed concrete piles . . . and finishing the job on schedule time . . .

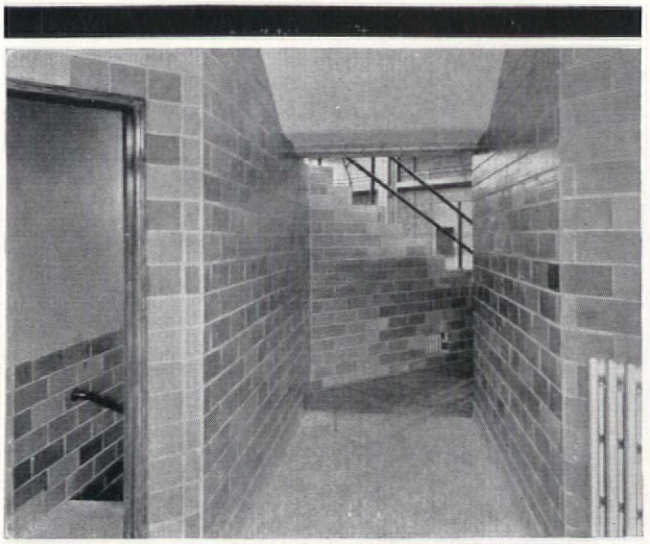
And now, the completed plant of the American Enka Corporation standing securely on sturdy columns of compressed concrete . . . concrete that is structurally sound all the way through . . . piles that are *full diameter* all the way to the bottom.

"Put it up to MacArthur" if you have a job where piles may be required. We drive every type of pile, therefore our suggestion as to the type pile best suited to your specific need can be, and *will be* unbiased.

MacARTHUR
CONCRETE PILE CORPORATION
19 WEST 44th STREET, NEW YORK CITY

Branch Offices: Chicago, New Orleans, San Francisco, Pittsburgh, Detroit, Philadelphia, Cleveland, Boston

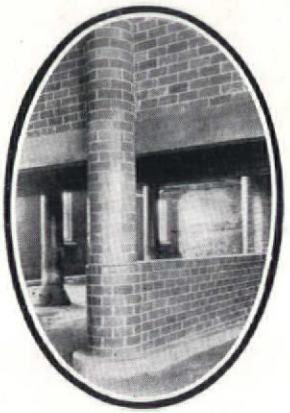
Canadian MacArthur Concrete Pile Co., Ltd., Montreal





VITRITILE *serves* 3 MASTERS

ARCHITECT
BUILDER
OWNER



In Oval—
NORTH OFFICE BLDG.
HARRISBURG, PA.
ROSS and GEHRON, *Architects*

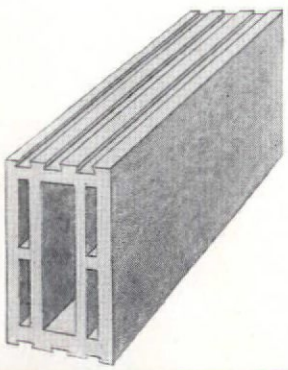
At Top—
GYMNASIUM
OTTERBEIN COLLEGE
WESTERVILLE, OHIO
ERNEST WATKINS, *Architect*

NATCO Vitritile appeals to *architects*—for it is available in natural and mottled shade ranges; in black; and in white. It affords ample field for color design. Its comprehensive assortment of shapes permits great latitude in structural design.

Natco Vitritile appeals to *builders* . . . for its high quality, ease and speed of laying, prompt and sure delivery, make construction easy.

Natco Vitritile appeals to *owners;* for the finish goes up with the wall itself. No plastering, painting or other maintenance is required.

Natco Vitritile—as would be expected of a member of the Complete Natco Line of Structural Clay Tile—serves honestly and well.



TURN TO SWEET'S

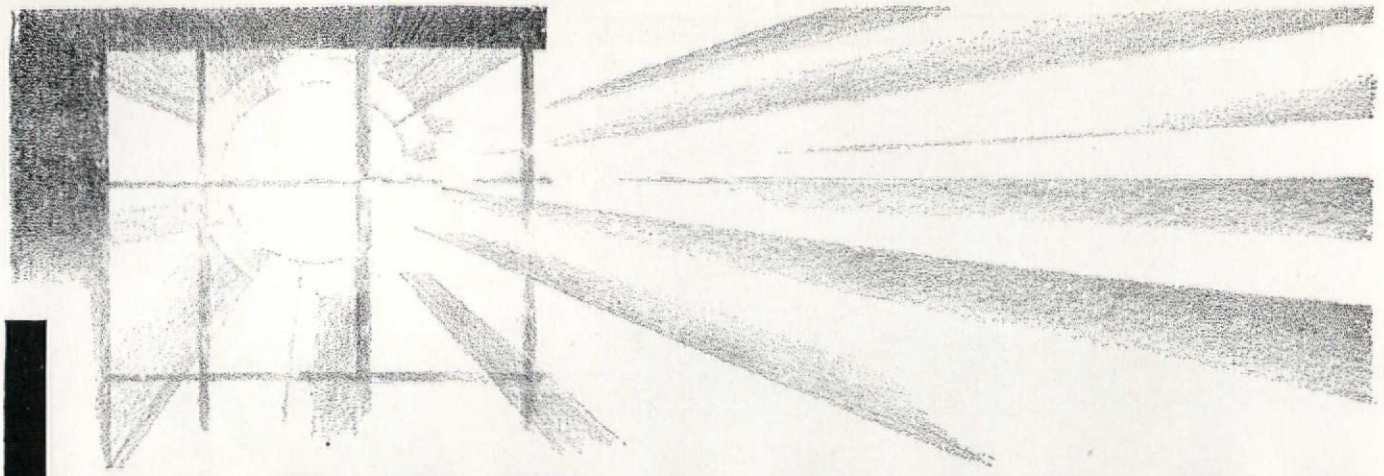


NATCO
THE *COMPLETE* LINE *of*
STRUCTURAL CLAY TILE

NATIONAL·FIREPROOFING·CORPORATION

THE LARGEST CONCERN IN THE WORLD MAKING A COMPLETE LINE OF STRUCTURAL CLAY PRODUCTS

GENERAL OFFICES: FULTON BUILDING, PITTSBURGH, PA. BRANCHES: NEW YORK, CHANIN BUILDING; CHICAGO, BUILDERS BUILDING; PHILADELPHIA, LAND TITLE BUILDING; BOSTON, TEXTILE BUILDING — NATIONAL FIRE PROOFING COMPANY OF CANADA, LTD., TORONTO, ONTARIO



LUSTRAGLASS

FLAT—DRAWN



A flatter, clearer, more lustrous glass . . . LUSTRAGLASS is a superior product in every respect, yet it costs no more than any other good window glass.

"Whatever rays you induce to flow through LUSTRAGLASS, the results are unquestionably conclusive". . . writes the man who made the test described at the right . . . *"My unrestricted congratulations."*

LUSTRAGLASS transmits a substantial amount of the shorter ultra-violet rays of sunlight of a wave length of 313 mu.*. . . If twenty-nine days exposure to these rays as transmitted by LUSTRAGLASS will benefit the health of plants to the extent illustrated in the chart, then it requires no imagination to see why LUSTRAGLASS should be specified for every window in homes, schools, factories and offices . . . Buildings in which growing children and workers spend at least ninety per cent of their lives.

LUSTRAGLASS is the highest quality window glass that *research, skill* and *improved manufacturing processes* have ever produced. It is the *"whitest"* of all glass made for windows, that greenish cast characteristic of window glass has been almost entirely eliminated . . . *Remember always* "Specify LUSTRAGLASS instead of window glass."

**Write for LUSTRAGLASS BOOKLET A-430 and see complete table of transmission.*

AMERICAN · WINDOW

1600 Farmers Bank Building

Lustraglass Flat Drawn, Clear Sheet Window Glass, Armor-Lite Scatter-proof and Bullet-proof Glass, 16 oz. Picture Glass, Photographic Dry Plate Glass, 1/8"

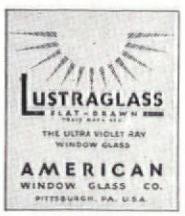
3039

A NEW AND BETTER GLASS FOR WINDOWS

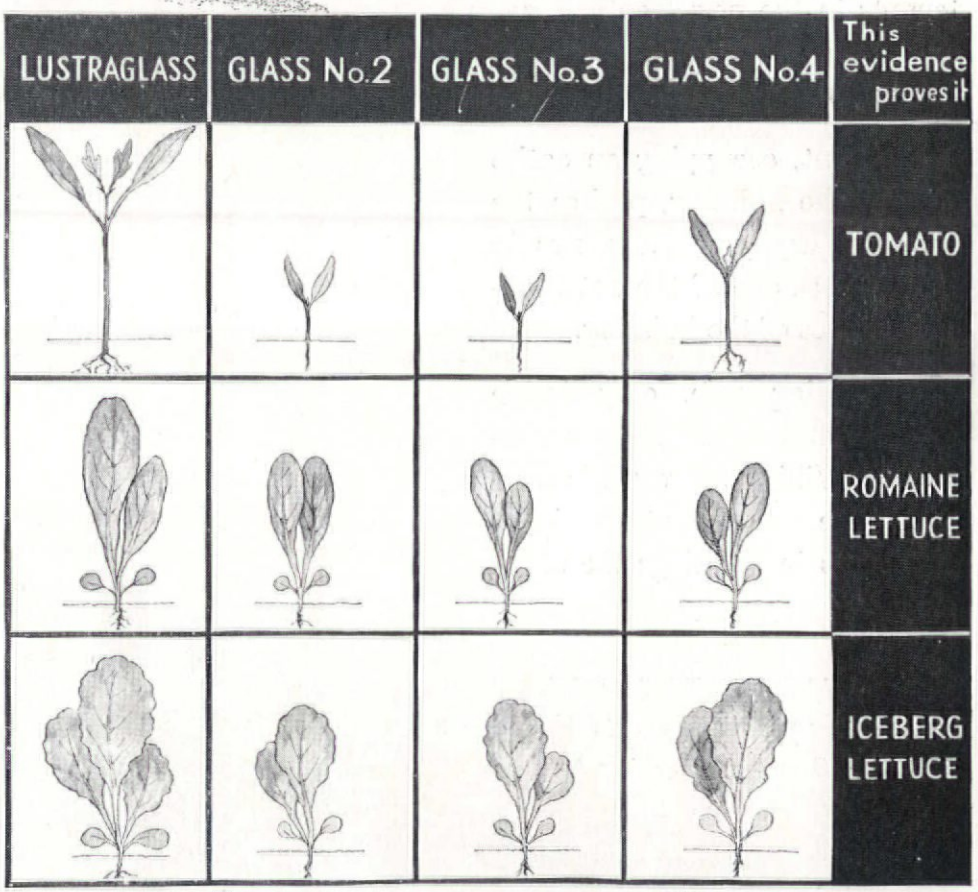
TRANSMITS ULTRA-VIOLET SUN RAYS

Costs no more than any good window glass . . .

THE plants shown on this chart are exact tracings of the actual shoots grown by a disinterested party for experimental purposes. Conditions under all four frames of glass were identical as regards fertilization, watering, location of frames, amount of available sunlight and time allotted to test. All seeds were planted at noon on March 19, 1930 and pulled up at noon April 17, 1930. The shoots selected for illustration represent a true and accurate average in height, spread and root development. The value of LUSTRAGLASS would have been even more pronounced had there been more time allotted to the test.



Look for this label on every light of genuine Lustraglass



· GLASS · COMPANY

and 7/32" Crystal Sheet, Ground and Chipped Glass, Improved Quartz-Lite and Bulb Edge Glass in single and double strength as well as 3/16" and 1/4" Crystal Sheet.

Pittsburgh, Pennsylvania

WILLIAMS EQUIPPED WINDOWS

STIR TENANTS' ENTHUSIASM IN THIS BUILDING

Proof that tenants do appreciate the advantages that Williams Equipped Windows afford, is evidenced in the enthusiasm of tenants in the new Central Savings and Loan Bank Building, Youngstown, Ohio.

One tenant, occupying an entire floor in the building, praises the Williams Equipped Windows in his office, as one of the outstanding features of the building.

In providing safe, easy inside cleaning and ideal draftless ventilation, Williams Reversible Windows have made countless friends of tenants in buildings the country over.

THE WILLIAMS PIVOT SASH COMPANY
East 37th Street at Perkins Avenue
CLEVELAND, OHIO

For 26 years manufacturers and installers of reversible window equipment



The Central Savings and Loan Bank Building, Youngstown, Ohio.
Morris W. Scheibel, architect, Rowland M. Johnson, associate architect

WILLIAMS REVERSIBLE WINDOW EQUIPMENT

Clean Your Windows from the Inside

Tune in on the Graybar Program at 10 P. M. Eastern Daylight Saving Time, every Tuesday . . . . . Columbia Broadcasting System

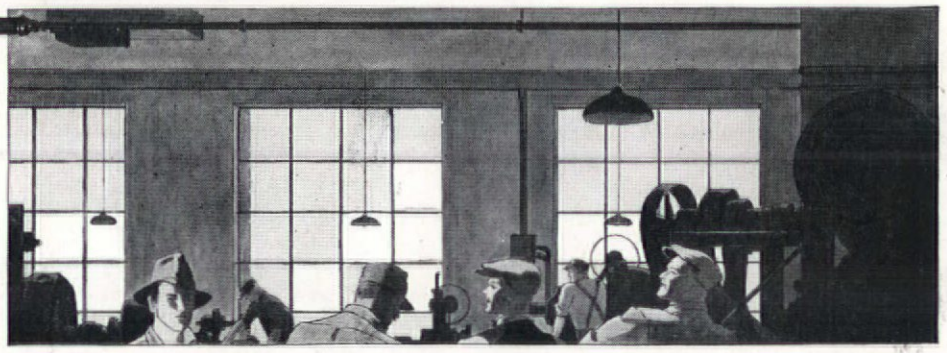
"Mr. Benson!"

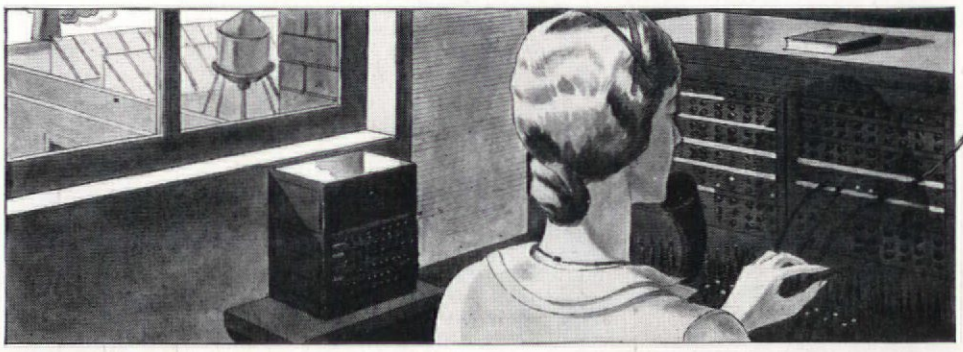




"Nurse wanted!"

"12 o'clock!"





"Jones, report to main office"

. . . say it with signals . . . Let these time-and-distance annihilating signals from Graybar warn you against danger . . . carry your messages . . . "tell" your men . . . There's a Graybar signalling device for *every* interior communication need. And there's a Graybar signalling expert to show you how these signals can conserve *your* dollars.

GraybaR

OFFICES IN 76 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK, N. Y.

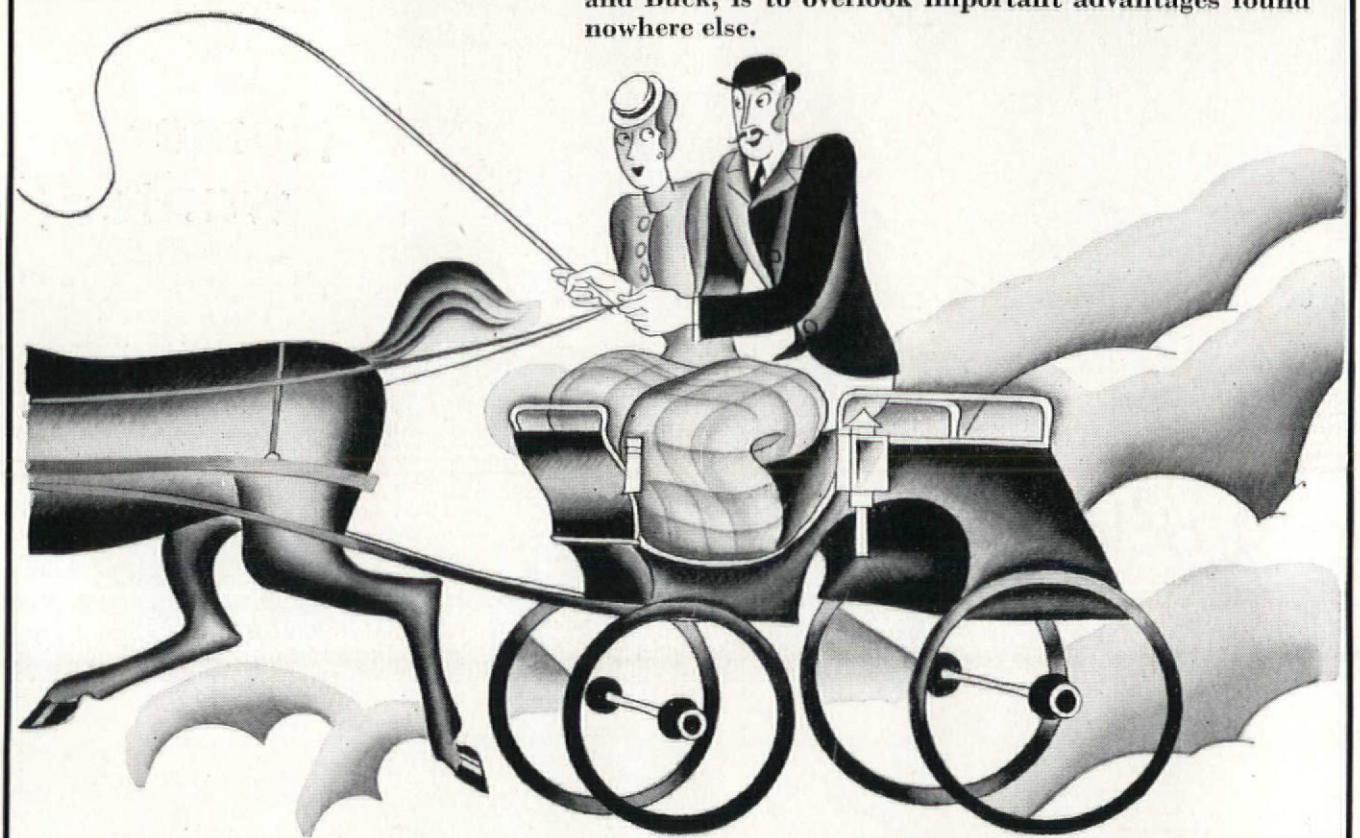
things are different now!

Old-fashioned decoration, ornate and inefficient building methods went out with horse and buggy days. Now, Kalman Steel Jamb and Buck provides a frame *years in advance* of all others.

Superior in design—the Kalman door frame fits closely over tile and forms a definite unit with the wall structure. Thousands of slammings of a heavy door failed to cause even the slightest plaster crack.

Finished appearance is unusually attractive . . . simple and modern in design without being extreme. The steel jamb may be finished to harmonize with any interior.

To use anything but Kalman Steel Buck, or Jamb and Buck, is to overlook important advantages found nowhere else.

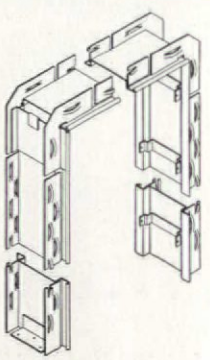


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Cleveland · Columbus · Dallas · Dayton · Detroit · Houston
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Structurally superior—the Kalman door frame permits tile setting to be checked, and the use of wall anchors to be verified. Staggered steel loops provide plaster reinforcement around the opening. Galvanized terminals form perfect plaster grounds—a flush door frame that is truly architectural.

We would be glad to send you photographs of the better apartments, office buildings, homes or public buildings, where Kalman Steel Buck, or Jamb and Buck have been used. No doubt you would also be interested in our file folder telling their 15 advantages.



METAL LATH · FURRING *and* LATHING PRODUCTS · HOME BUILDING PRODUCTS · STEEL DOOR FRAMES
STEEL JOISTS *and* ACCESSORIES · REINFORCING STEEL *and* CONCRETE ACCESSORIES · ROAD PRODUCTS

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may "have ears"— but they *can't read*!

WALLS can't read the advertising about the Plaster that goes on them, so they don't know what to expect of it. A wall just has to put up with the Plaster your contractor puts on—whether it makes the wall feel strong or puny. Whether it slips easily, or drags across with leaden feet. So let's leave this question of using Gypsteel Gypsum Plaster to the walls and ceilings.

If they feel *stronger* and *tougher* when Gypsteel goes on, fine. You'll keep on using Gypsteel. If they don't like it, you won't want Gypsteel no matter how many nice things we say about it.

Just test Gypsteel on the walls of your next job. *Feel* the difference in their strength and toughness.



If this test didn't prove out so often there wouldn't be so many architects and builders insisting on Gypsteel Plasters.

General Offices: Linden, N. J.

STRUCTURAL GYPSUM CORPORATION

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IF Kinnear Rolling Doors are a superior product, and it is generally conceded by those who specify, install and use equipment of this type that they are—it is simply a reflection of the ideals of their maker. Kinnear has the courage, the financial resources, and the engineering ability to maintain the standards instituted 35 years ago when the idea of a rolling steel door first was conceived. Kinnear Doors cost a trifle more, but the years always prove their worth.

THE KINNEAR MANUFACTURING CO.
401-451 Field Avenue, Columbus, Ohio, U. S. A.

Boston Chicago Cincinnati Cleveland Detroit New Orleans
New York Philadelphia Pittsburgh Kansas City Washington

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ROLLING DOORS

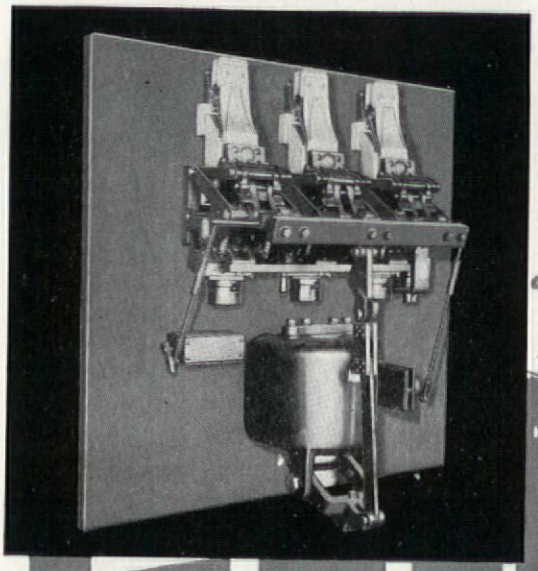
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to meet the need

of

MODERN

SKYSCRAPERS



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ADEQUATE control of distributed power was a problem of vital importance to architects in constructing modern skyscrapers.

In its solution, Westinghouse high-power laboratories played an important part. Power conditions similar to those met in modern buildings were set up for test purposes which made it possible to foresee breaker requirements to cope with new conditions.

From data thus obtained grew the modern CL carbon circuit breaker—the breaker that is being used so successfully in such structures as the Chicago Civic Opera Building, the Chrysler Building, the Atlantic City Convention Hall and many others.

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AMERICA has demanded and is getting color harmonies in its bathrooms—fixtures to blend with wall and floor.

"Tepeco" has recently found an expressed desire for the same harmonies in the public toilet and washroom.

In perfect harmony with any decorative scheme one may devise, they provide the utmost in beauty with no sacrifice in sanitation, for every "Tepeco" Fixture, regardless of its color or design, carries the same guarantee of durability and quality.

Full information and color charts showing the available colors on "Tepeco" All-Clay plumbing fixtures will be supplied on request.

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TRENTON, NEW JERSEY, U. S. A.

NATIONAL EXHIBIT ROOMS
101 Park Ave., New York City
Entrance on 41st Street

SALES OFFICES
in Philadelphia, Boston
and San Francisco

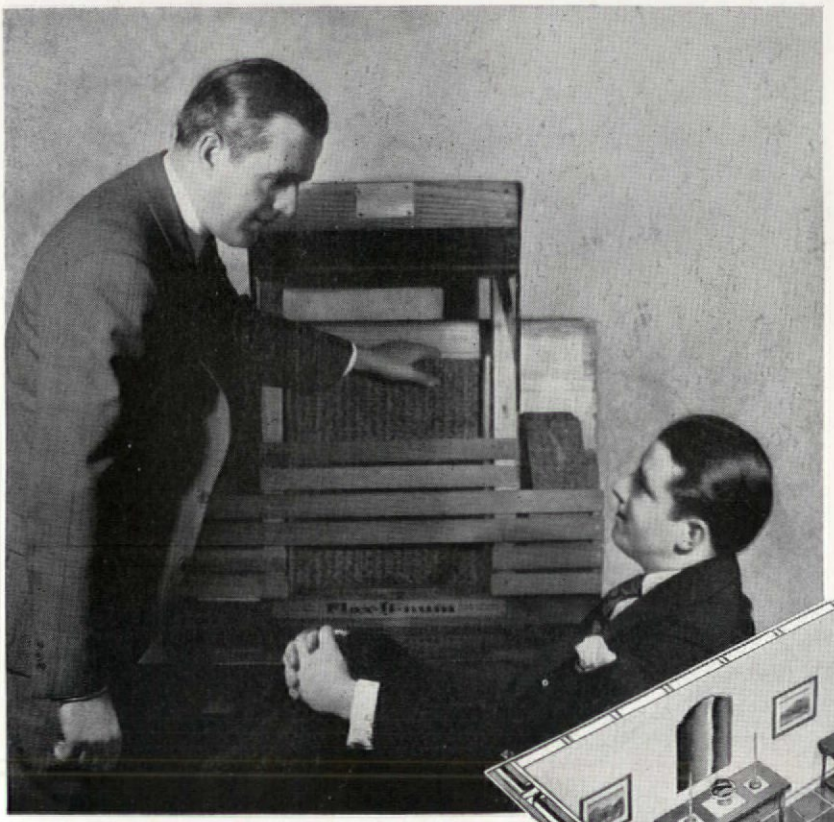
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Our Guarantee

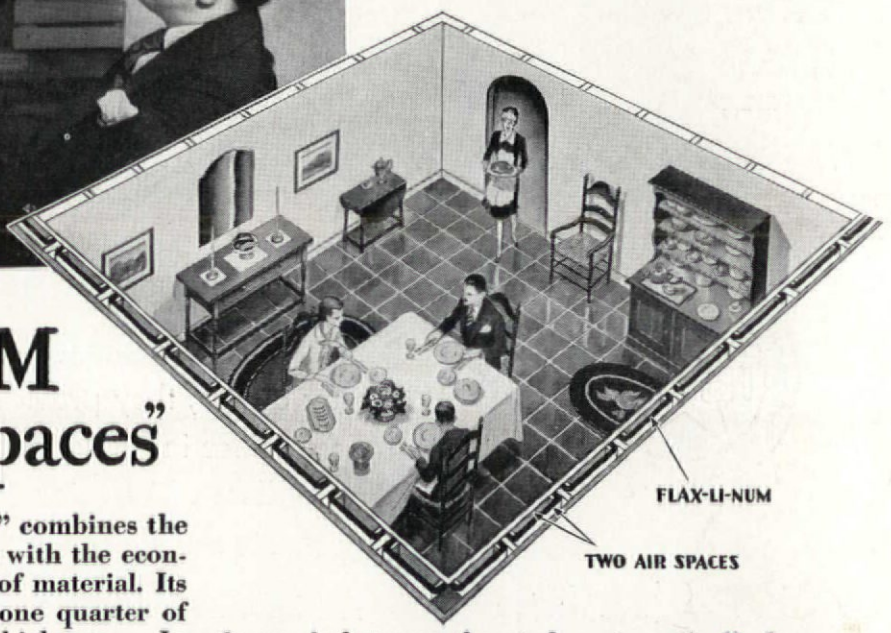
We make but one grade of ware—the best that can be produced—and sell it at reasonable prices. We sell no seconds or culls. Our ware is guaranteed to be equal in quality and durability to any sanitary ware made in the world. The "Tepeco" trade mark is found on all goods manufactured by us and is your guarantee that you have received that for which you have paid.

TE-PE-CO
ALL CLAY PLUMBING FIXTURES

50% GREATER... Insulating Value



. . . from an economical thickness of material

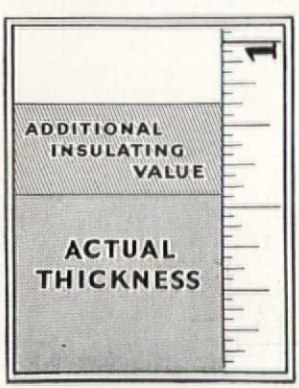


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FLAX-LI-NUM with "two-air-spaces" combines the greatest possible insulating value with the economy of an economical thickness of material. Its resistance to heat is more than one quarter of an inch greater than its actual thickness . . In other words, it is over 50% more efficient than insulation applied in any other way.

This means greater home comfort and greater fuel economy at no extra cost. A single application is sufficient . . FLAX-LI-NUM can be applied as quickly and as easily as less efficient materials for FLAX-LI-NUM is flanged to fit snugly between the studs, automatically forming the famous "two-air-spaces." It meets all requirements of a pure single purpose insulation . . permanence . . higher insulating value . . ease of application . . and scientific correctness.

Your request will bring a complete file of valuable data including specifications for the FLAX-LI-NUM "two-air-space" method of application . . You will also find data in Sweet's Architectural Catalog.



FLAX-LI-NUM INSULATING CO., *St. Paul, Minn.*

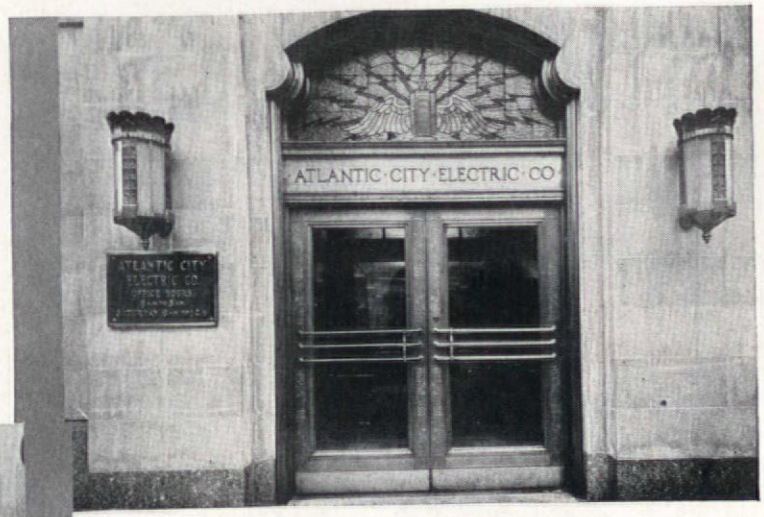
Flax-li-num

A CORRECT BUILDING INSULATION AND SOUND CONTROL MATERIAL



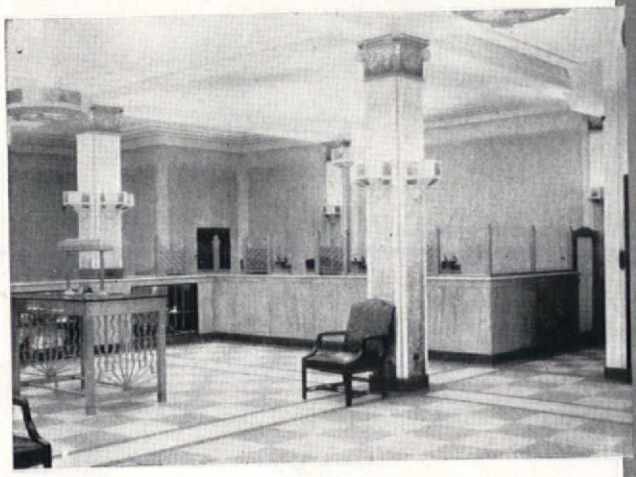
Bronze entrance unit...
Bronze counter screen...
Bronze check desk...

Built by Art Metal for the Atlantic City Electric Co.



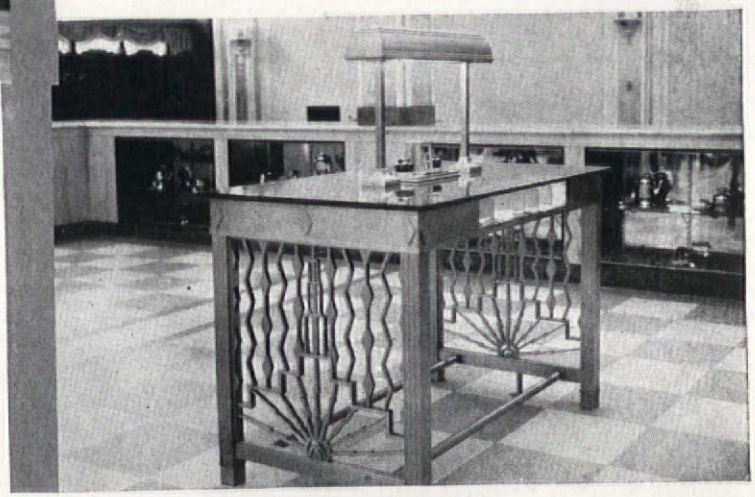
(Right)

Entrance unit in etched bronze. Doors, transoms, lights, complete with glass, hardware and saddle, were furnished for this new building of the Atlantic City Electric Co., by Art Metal. Architect, Vivian B. Smith of Atlantic City.



(Left)

Modern treatment features the bronze counter screen assembly in the same building. This is a specially built Art Metal cast bronze counter screen, with 13 center and end pilasters, hinge wickets, base rail, walnut-finished steel paneled gate in counter screen.



(Right)

Detail of the cast bronze check desk shows the same modernistic design used throughout. Reproduced in bronze by Art Metal craftsmen, it carries out the architect's original conception.

From more than forty years in manufacturing architectural bronze and hollow metal building equipment, Art Metal has a specialized knowledge valuable to architects. May we send a representative to consult with you on your next job? There is no obligation. Art Metal Construction Company, Jamestown, N. Y.

Art Metal

JAMESTOWN ~ NEW YORK

BRONZE AND STEEL INTERIOR EQUIPMENT FOR BANKS, LIBRARIES AND PUBLIC BUILDINGS . . . HOLLOW METAL DOORS AND TRIM



everyone loses when the PLASTER cracks !

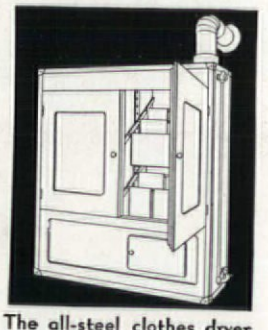
ARCHITECT—contractor—owner—all lose when unsightly cracks appear on plastered walls and ceilings.

Futile to explain away their existence by saying; "Ordinary lath naturally expands and contracts in changing moisture conditions;" that "cracks appear due to slight foundation settling."

For the question then arises, "Why wasn't steel lath used instead?" Steel lath that prevents plaster cracking . . . that affords protection from fire . . . that eventually saves its own cost in minimized redecoration charges.

Buyers are paying more and more attention to the plaster base. They have become educated to the comfort, economy and safety brought about by the use of steel in the home—colorful steel furnaces, enameled steel tile for the bathroom and basement; laundry trays, radiator enclosures, clothes chutes—even steel doors and trim.

For information concerning any steel building product write Trade Research Division, National Association Flat Rolled Steel Manufacturers, Terminal Tower Building, Cleveland, Ohio.



The all-steel clothes dryer has a decided influence on the sale or renting of a home. Saves labor and time.

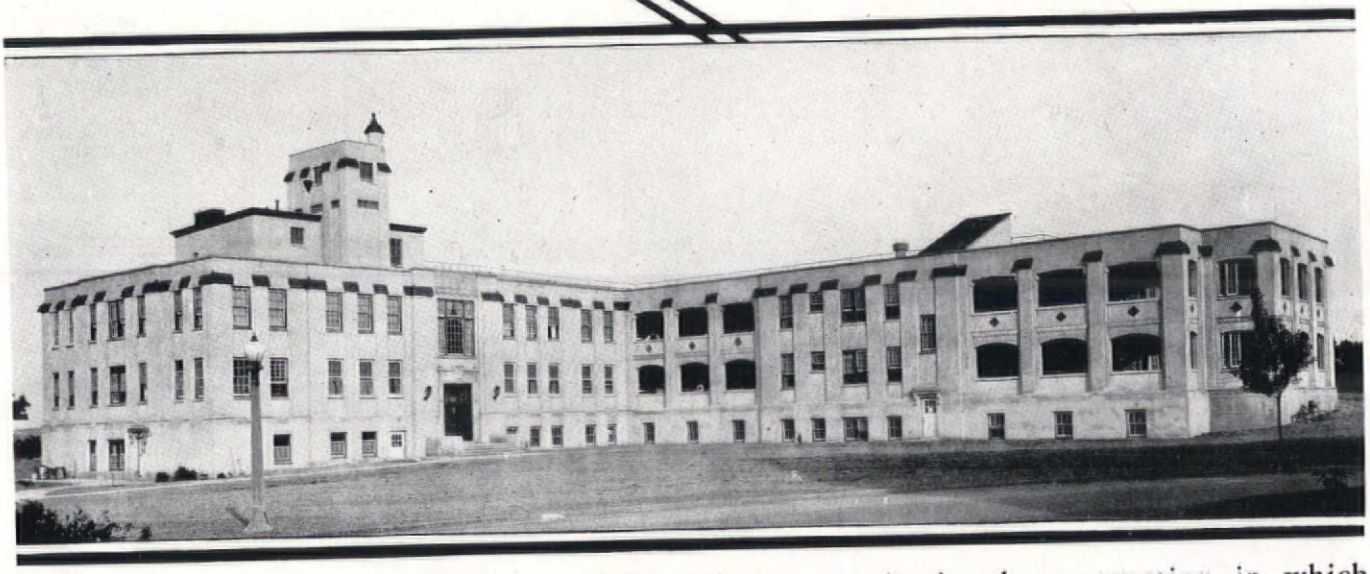


Steel radiator covers add another piece of beautiful furniture to the home and vanishes the unsightly radiator.

Save Labor Time Money with Steel LATH

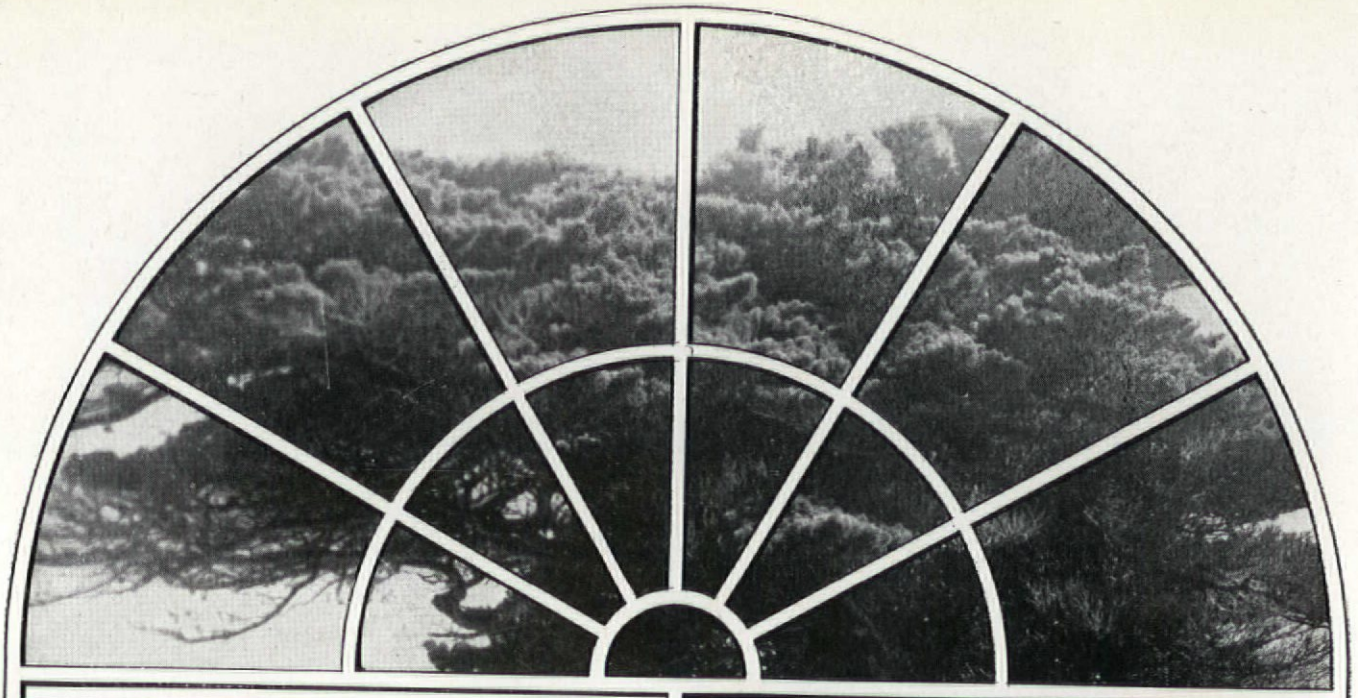
TONCAN

Beauty deserves the protection of TONCAN . . .



The elaborate institutional construction in which municipality, architect and builder take so much pride and satisfaction deserves the utmost in economical protection. That's the reason for the ever increasing number of beautiful public buildings Toncan-fitted. ¶ For cornices and down-spouting; for ventilators and window frames; for garage and out-building roofs, Toncan stands supreme. This scientific alloy of pure copper, pure iron and molybdenum combats rust and corrosion long after the life of other ferrous metals. Toncan makes frequent repairs unnecessary; Toncan saves the expensive inconvenience of rebuilding and replacing. ¶ Specify Toncan—and forget rust and corrosion. Full information on request to: Central Alloy Steel Division Republic Steel Corporation, Youngstown, O.

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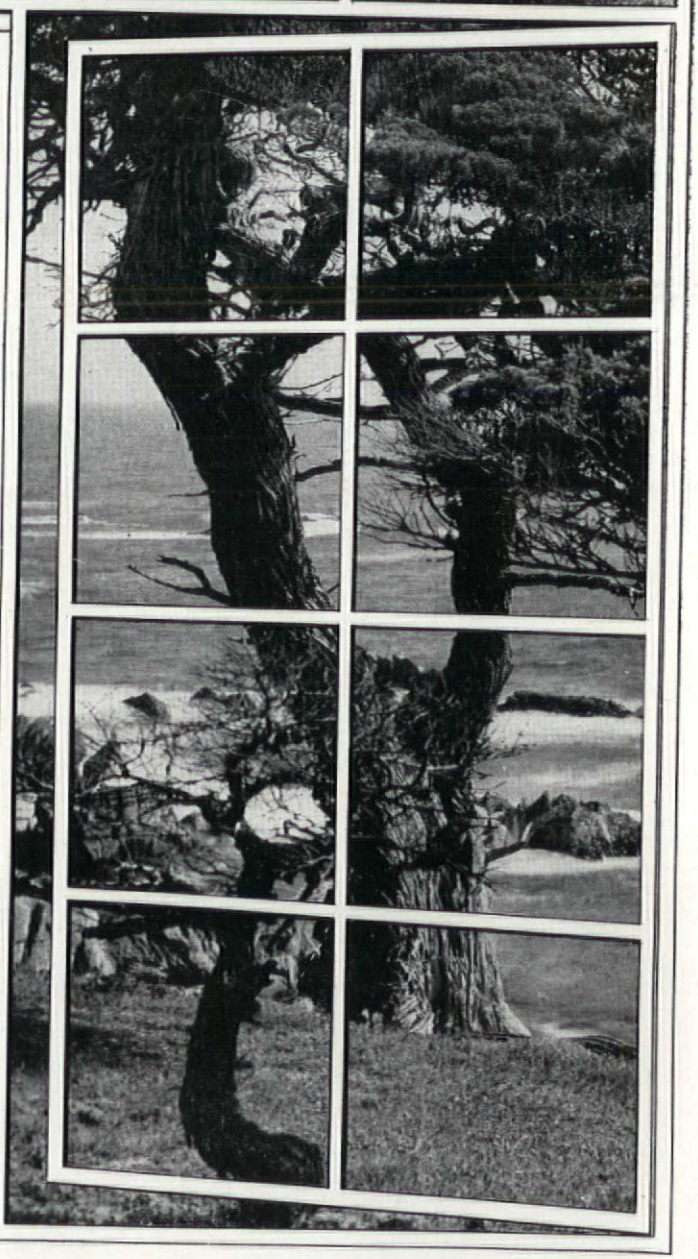
FLATTER, BRIGHTER ON BOTH SIDES

MADE by a brand-new process, the new Pennvernon Window Glass is *born* flat and *kept* flat throughout its entire manufacture—from molten "metal" to finished sheet. No chance to become bowed, bent, defaced. No "right" or "wrong" side to bother the glazier in setting this new glass.

And this brighter, flatter, better glass costs no more than *ordinary* window glass!

The warehouses of the Pittsburgh Plate Glass Co., conveniently located in all the leading cities of the United States, are ready to make prompt deliveries. Let us send you our new Pennvernon Booklet containing the absorbing story of the new process by which this glass is made. Write the Pittsburgh Plate Glass Company, Pittsburgh, Pa.

PENNVERNON
flat drawn
WINDOW GLASS

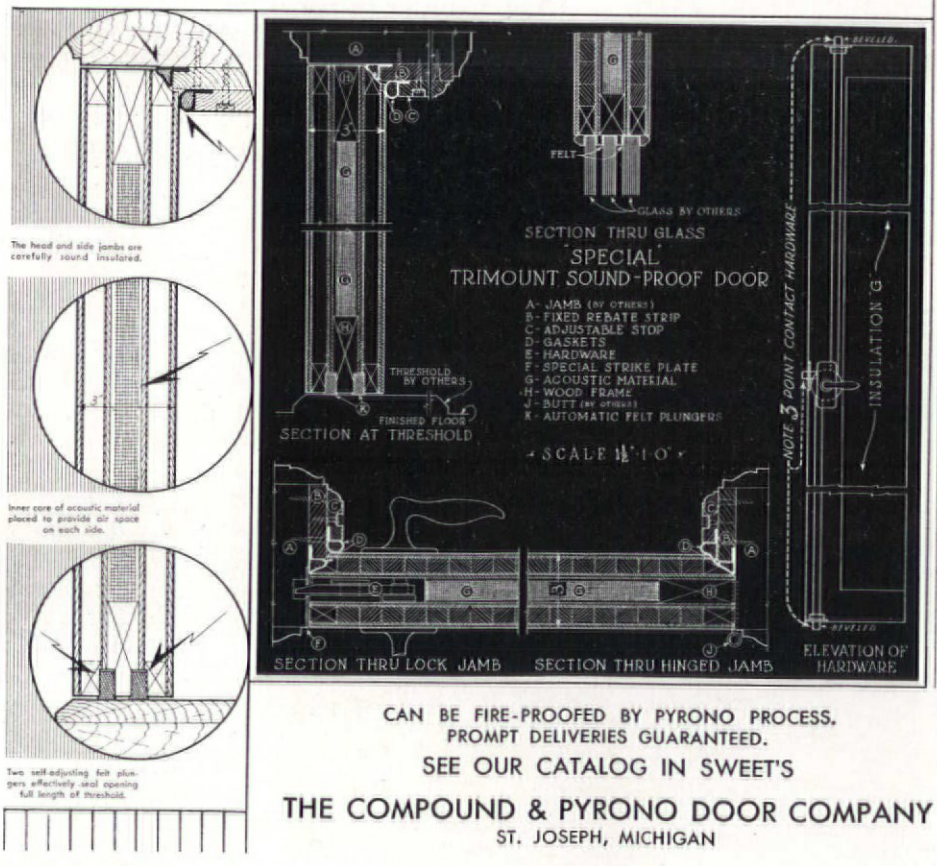


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in the National Broadcasting Co. Studios in this colossus of modern buildings — The Merchandise Mart, Chicago. After exhaustive investigation

TRIMOUNT SOUND-INSULATED DOORS

were selected by the architects and the National Broadcasting Co. because of their efficiency in retarding noise and the desirable merits of their sturdy construction. Fifty-seven sound insulated doors were required.





Merchandise Mart, Chicago.
Graham, Anderson, Probst & White, Architects.
U. S. Gypsum Co., Sound Insulating Contractors.

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National Broadcasting Co. Studios New York City. Raymond Hood.

Columbia Broadcasting Co. Studios Washington, D. C. Columbia B. C. Co. Engineers.

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Radio Broadcasting Studios WGN Chicago, Ill. Howells & Hood.

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Eastman Kodak Co., Rochester, N. Y. Stevens Sound-Proofing Co.

Civic Opera Building, Chicago, Ill. Graham, Anderson, Probst & White.

Cooley School Addition, Detroit, Mich. Donaldson & Meier.

Cadillac Motor Co., Engrg. Bldg. Detroit, Mich. Albert Kahn.

Concert Hall, Dupont Est., Longwood Garden, Pa. E. W. Martin.

Fine Arts Building, Tulsa University H. C. Hibbs.

Baker Library Addn., Boston, Mass. McKim, Mead & White.

Johns Hopkins Hosp., Baltimore, Md. Contractor, John H. Hampshire, Inc.

United Research Corp. Laboratories New York, N. Y. Stevens Sound-Proofing Co.

Music Building, University of N. C. Chapel Hill, N. C. Atwood & Nash, Inc.

Cowan & Pringle Studios, New York.

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THE COMPOUND & PYRONO DOOR COMPANY
ST. JOSEPH, MICHIGAN

AMERICA'S OLDEST VENEERED DOOR SPECIALISTS

The Three H's —they're in all Bayley Products



HEAD, Heart and Hand — the best of each — go into Bayley Windows and Doors. This blending of ingenuity, sincerity and craftsmanship makes Bayley Products outstanding.

Even the casual observer recognizes their better value — in design and construction — while the buyer finds his good judgment confirmed in the enduring satisfaction they give, year after year.

Building service into products is a rigid Bayley policy, accepted and understood by every man in the organization — which includes veteran mechanics and their sons.

No organization has more cause for justifiable pride in its work, for no organization puts more of itself into its products. The best thought and skill are embodied even in the smallest details.

Forty-nine years of experience in metal work provides a valuable background for Bayley engineering cooperation, which is available without cost or obligation . . . The William Bayley Company, 132 North St., Springfield, Ohio.

District Offices

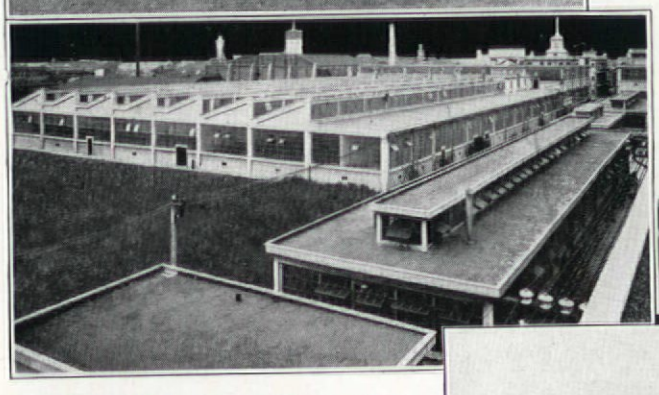
New York, 67 W. 44th St.
Boston, 5 Park St.
Chicago, 75 E. Wacker Drive
Cleveland, 449 Terminal Tower
Washington, 1427 I St., N. W.
Atlanta, 407 Bona Allen Bldg.
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STEEL WINDOWS & DOORS

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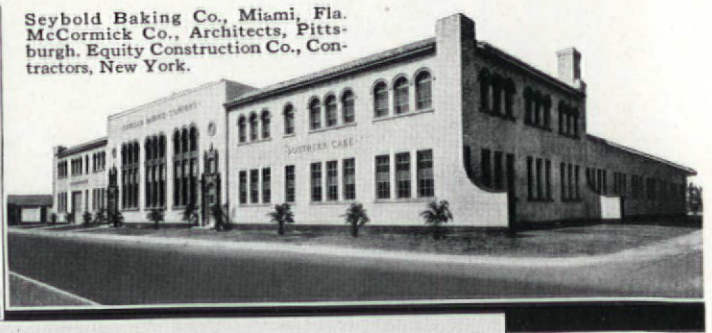


High School, Wichita, Kansas. Glen H. Thomas, Architect — Wichita, Kansas. Ernest Rokahr & Sons, Contractors, Lincoln, Nebr.

Residence — Eastman & Budke, Architects, Springfield, Ohio. Ralph A. Puterbaugh, Contractor, Springfield, Ohio.

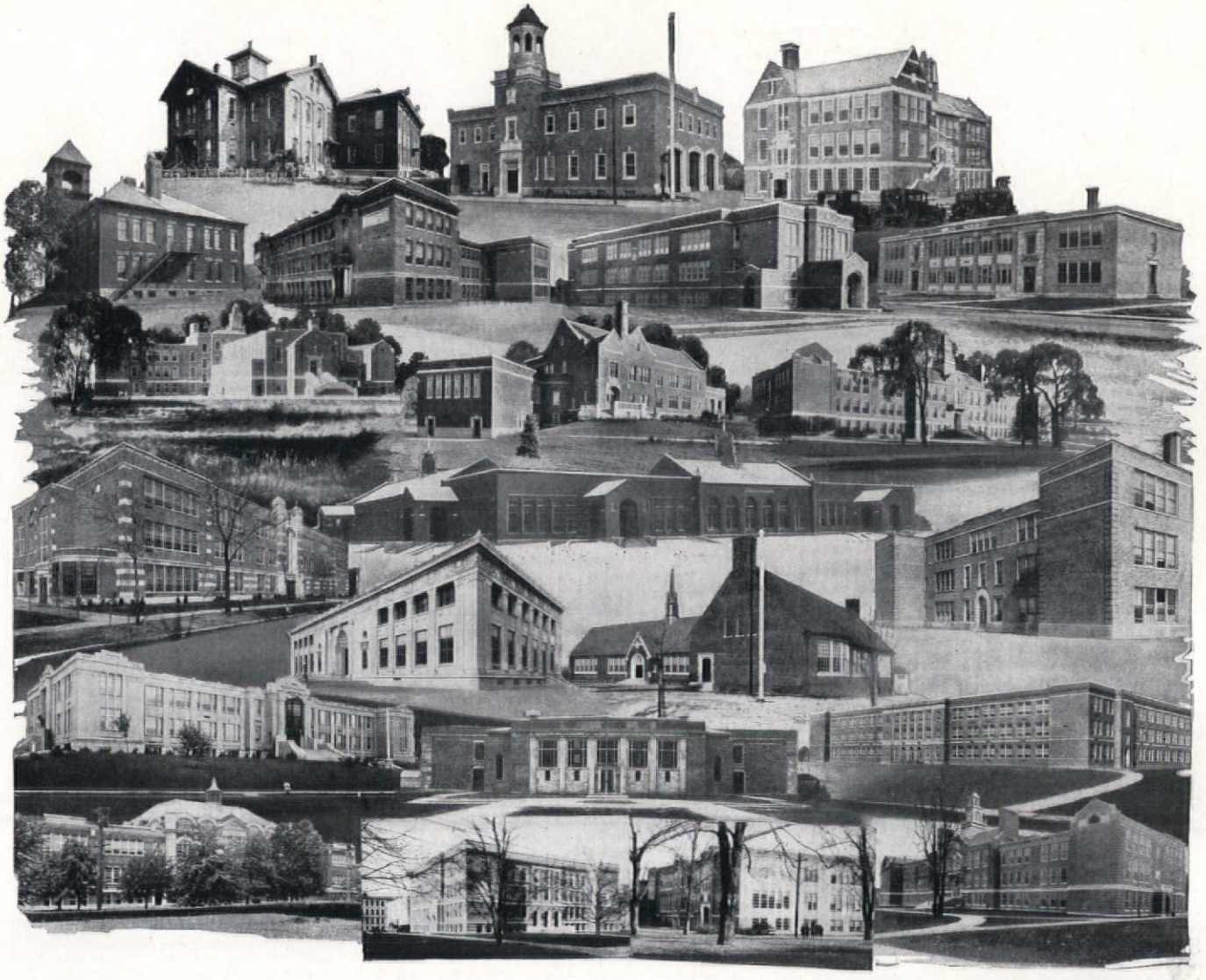
Weave shed of the Textile Mfg. Co., Shanghai, China. Anderson Meyer & Co., Ltd., Engineers, Shanghai, China. Dao Kwei Kee, Contractor, Shanghai, China.

Seybold Baking Co., Miami, Fla. McCormick Co., Architects, Pittsburgh. Equity Construction Co., Contractors, New York.





Atlantic Coast Line Shop, Uceta, Fla. Designed and built by Dwight P. Robinson & Co., Engineers and Contractors, Philadelphia, Pa.



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SINCE the original PeerVent Heating and Ventilating Unit was designed and installed 19 years ago, thousands of buildings in towns and cities from coast to coast have been equipped with PeerVents. These PeerVents of nineteen years ago are still giving perfect satisfaction.

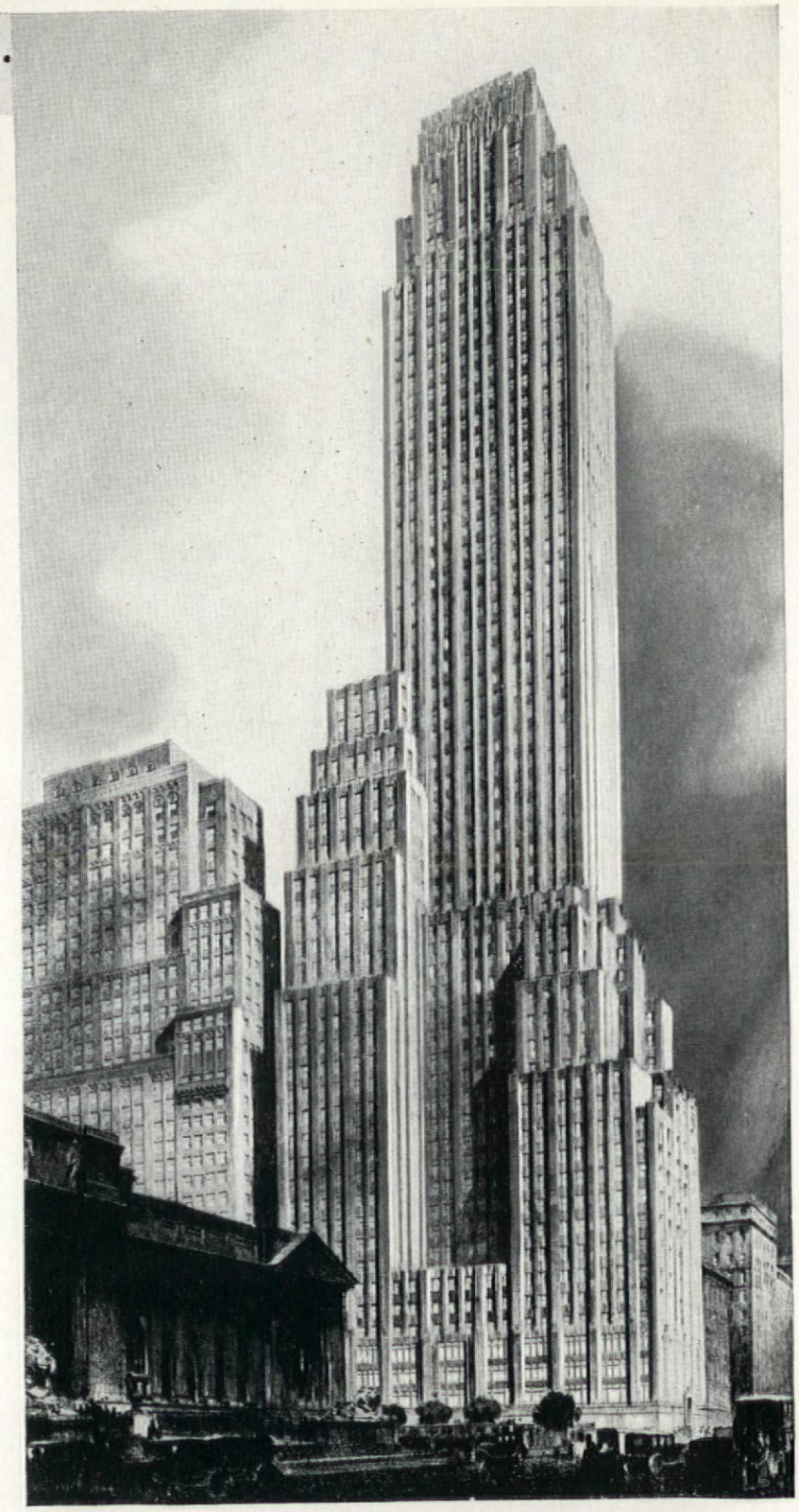
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PEERLESS UNIT VENTILATION CO., Inc.
BRIDGEPORT, CONNECTICUT
Pioneers in Unit Ventilation
Resident Engineers in Principal Cities from Coast to Coast

500 FIFTH AVE.

NEW YORK CITY



ARCHITECTS: SHREVE, LAMB & HARMON

THE new 58-story Tower, now under construction for Walter J. Salmon by Charles T. Wills, Inc., on the northwest corner of Fifth Avenue and Forty-Second Street. Here, as in the adjoining Salmon Tower, Eleven West Forty-Second Street, all of the interior doors, trim and elevator entrances will be supplied by the

DAHLSTROM METALLIC DOOR COMPANY

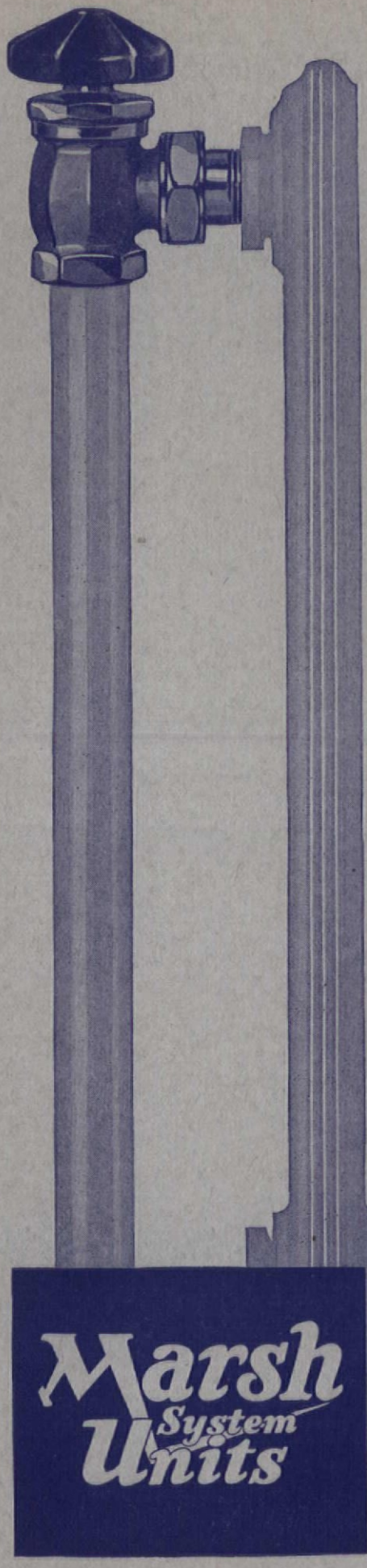
Established 1904 ~ 449 Buffalo Street, JAMESTOWN, N.Y.

NEW YORK CHICAGO

LOS ANGELES DETROIT DALLAS

Elevator Entrances by

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MARSH

presents truly modern heating

. . . matched units

The creation of matched radiator units in the modern manner is typical of the progressive quality of Marsh engineering.

From the ultra modern, hand-fitting, handsome, Bakelite wheel to the base of the trap, these units . . . set off by an enduring two-tone finish of lustrous chromium . . . blend harmoniously with the finest interiors, whether of homes or of public buildings.

Marsh engineering for sixty-five years has contributed to the increased efficiency and economy of heating systems. It is natural that Marsh products should be chosen on the most modern buildings for their superiority of interior design, smooth operation and sturdy construction.

See the nearest Marsh representative for complete details of these matched units.

Increased activity in rapidly expanding markets has made it necessary to increase the number of our representatives. Sales engineers experienced in heating or similar lines are invited to write. If your territory is open, this may mean a valuable connection.

JAS. P. MARSH & CO.

(DIVISION OF COMMERCIAL INSTRUMENT CORPORATION)

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Connecticut Cradle Phone used for all types of inter-communicating systems. Four, six and eight button models complete with cord and terminal block. Finish is dull black.

CONNECTICUT *presents*

a perfected inter-communicating system



Surface Wall Telephone—an ideal instrument for elevator service. Hinged metal case, standard transmitter and receiver, double gong bell and calling button. Standard finish dull black—to match trim when so ordered.



Desk type phone and button block. Furnished complete with button and terminal block connected by six foot brown cord. Finish is dull black with nickel trim.



Surface type wall telephone fitted with standard transmitter and receiver. Button spring mechanism assembled as a separate unit mounted within the cabinet. Furnished in multiples of four buttons. Standard finish golden oak or Duco black with nickel trim.

The Connecticut Telephone & Electric Corporation has developed a new and perfected inter-communicating system especially adapted for office building, bank and apartment house installation.

This modern communicating system enables the building manager to come into immediate communication with any part of the building or with the heads of various departments—superintendent, engineer, head janitor, elevator starter, etc.

The system may be installed either at selected stations or to include connections on each floor with all departments and building employees. A building manager can thus give immediate instruction to all employees and check up on work going on throughout the building. It is the ideal method of handling the management of a building efficiently through department heads, employees, or both.

CONNECTICUT TELEPHONE & ELECTRIC CORPORATION

(Division of Commercial Instrument Corporation)

54 BRITANNIA STREET MERIDEN, CONNECTICUT

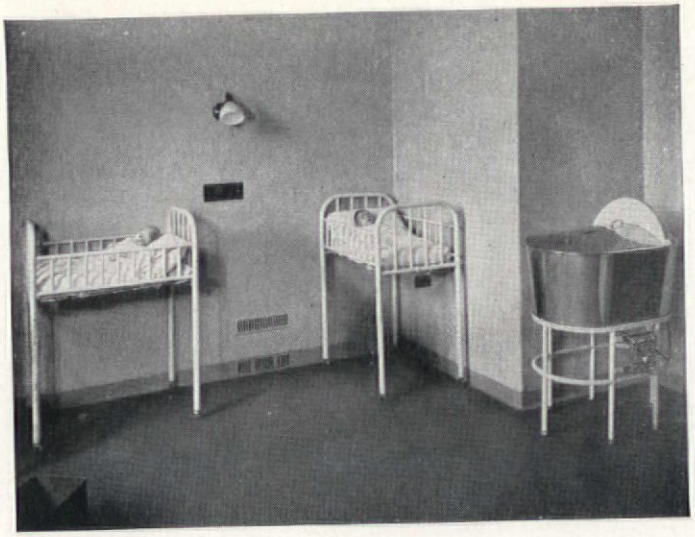
CONNECTICUT TELEPHONE & ELECTRIC CORPORATION
54 Britannia Street, Meriden, Connecticut

Gentlemen: Please send me your catalog 401-B describing communicating systems for every type of installation.

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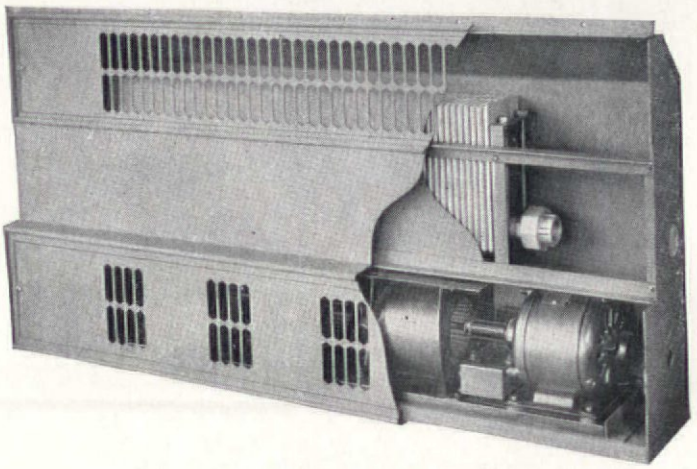


Aeriet Brings Health As Well As Comfort

THE Air-Way Aeriet-equipped room is always filled with fresh pure air. The desired temperature is obtained without depreciating the air quality. Diffusion of warmth or coolness is gentle, almost imperceptible, but positive and complete.

The cooling effect of air in motion is achieved without the discomforts of drafts and strong currents of air. Desired warmth is produced almost instantly and is equably distributed throughout the entire living area.

Architects and heating and ventilating engineers recognize in the Air-Way Aeriet an outstanding contribution to human health, as well as comfort and convenience. Wholly concealed, still it offers no installation, operation nor maintenance problem. It easily meets economic requirements.



The all-electric Aeriet makes the use of electricity as fuel practicable and economical. The steam, hot water, or vapor Aeriet gives these familiar heat elements a far greater efficiency than any other form of radiation. Investigate the Aeriet. Complete information sent promptly on request.

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Air-Way
TRADE MARK
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Please send me the Air-Way Aeriet book.

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AR



Hartford Mortuary, El Paso, Texas. Guy L. Fraser, Architect. Fourteen Union Metal Columns 16" x 16' 10", Design No. 237, used.

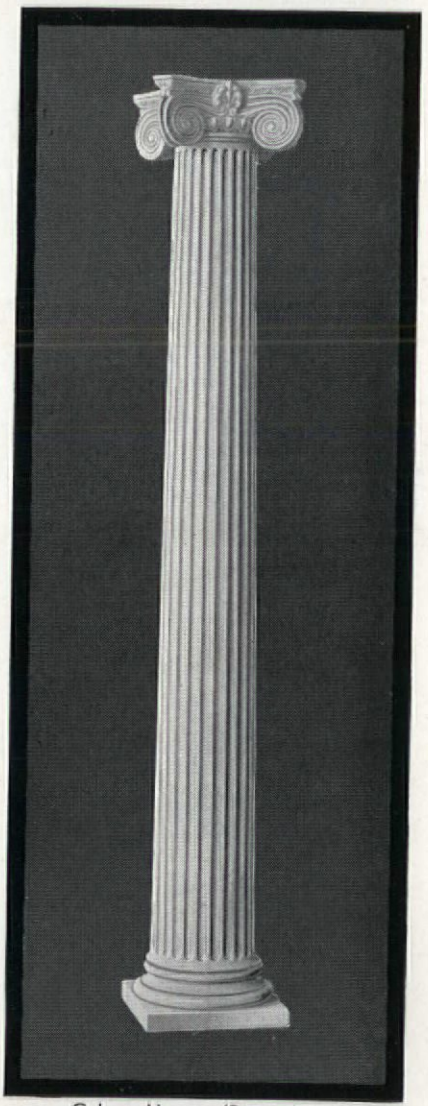
CLASSIC DIGNITY

WHERE the building calls for dignity and conservative design, there Union Metal Columns are most appropriate. Their classical design makes them particularly well suited to the large public or semi-public building.

The manufacture of Union Metal Columns from heavy steel provides sharp flutes and clean-cut details. No horizontal seams mar the appearance of the columns. Here, then, are columns architecturally correct, graceful, sturdy, accurately proportioned—columns which express in every line the beauty and dignity of the classical tradition.

Union Metal Columns are produced in ten styles and in heights from 5' to 35'. Larger sizes can be furnished to order, making the advantages of steel columns available for practically every type of building.

THE UNION METAL MANUFACTURING CO.
GENERAL OFFICES AND FACTORY: CANTON, OHIO
SALES OFFICES: New York, Chicago, Cleveland, Boston, Los Angeles, San Francisco, Seattle, Dallas, Atlanta.
Representatives throughout the United States



Column No. 237 (Pressed steel with Composition Capital).

UNION METAL COLUMNS

"THEY LAST A LIFETIME"

The Boiler for your Client's Building is the one you'd choose for your own.



There's "time" that goes "up the stack" too!

Boilers burn two kinds of fuel. One is the engineer's time. Some regular upkeep is necessary, but every extra hour it takes to keep a boiler in service is time that goes "up the stack"—time that's wasted. You want a boiler built to conserve time.

TITUSVILLE "SR" Welded Boilers



cost least in the long run because they burn up less of an engineer's time. The regular maintenance is made easier. There are wide openings through which to get at things. The boiler is *designed* for easy upkeep. And the likelihood of needing out-of-the-ordinary repairs is very small. That, too, is a function of far-seeing design. Titusville Boilers are boilers you'd like to own if you, yourself, were operating buildings.

Investigate these easy-upkeep Titusville Boilers. Ask us to send the new bulletins.

THE TITUSVILLE
IRON WORKS COMPANY
Division of Struthers Wells-Titusville Corporation
TITUSVILLE, PA.
Branch Sales Offices in all Principal Cities

TIW-48

JOHNS-MANVILLE
JM
PRODUCTS



Working from outside the house the staff of the J-M Home Insulation Contractor blows this effective insulation into place.

The wall section shown at the right illustrates how closely J-M Home Insulation packs into the walls, filling all the spaces between the studs.

Johns-Manville
HOME
INSULATION

JOHNS-MANVILLE
JM
PRODUCTS

Here, we believe, is the ultimate in home insulation . . . .

HOUSE insulation is becoming an increasingly important matter, as your clients become more and more familiar with the subject — as they become more interested in increasing home comforts and reducing heating costs.

We have developed a unique method of applying an old and tried insulating material to the job of controlling temperature changes and heat losses in dwellings and other buildings. This material, of which J-M Home Insulation is made, is rock wool, long familiar for its high resistance to the passage of heat.

A Unique Method of Application

To put this light, loose, woolly material, firmly into place, we have perfected a method of blowing it, by means of compressed air, into the spaces between the inner and outer walls. This method insures filling every nook and cranny in the walls, without any dirt or litter about the job. It is really the first practical method of insulating finished structures. J-M Home Insulation is equally effective in an old house or one under construction and can be applied with equal ease to both.

An Invisible Inner House

The result of applying J-M Home Insulation is an invisible barrier to heat built within the walls. Without being seen, and without the slightest effect to your design, it makes the house more comfortable and pleasanter to live in—and more efficient to operate. The insulation value of J-M Home Insulation in a wall having 2" x 4" studs is equivalent to that of eleven feet of solid concrete — surely a showing which can be called remarkable.

It is our desire to be real co-operators with architects in connection with our Home Insulation as with all of our diversified products. That is why we maintain a staff of architecturally trained men, who have mastered thoroughly the technical details of J-M Home Insulation as well as our other products. They welcome opportunities to be of assistance to you in connection with any plans in which insulation is being considered.

JOHNS MANVILLE JM PRODUCTS

FOR THE BUILDING INDUSTRY

Acoustical Materials — Asbestocel Pipe Insulations — Asbestos and Asphalt Shingles — Built-Up Roofs
Home Insulation — Insulating Board — Transite — Tile Flooring — Floridene Stone

Johns-Manville

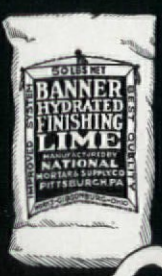
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MADE FROM THE EARTH'S BEST LIMESTONE



OHIO DOLOMITE

From the famous dolomitic, or high magnesium, limestone deposit in northwestern Ohio is made the finest finishing lime. Here more lime is produced than in any other like area in the country. A large, well equipped quarry in this territory supplies the stone from which Banner Finish is made. The composition of this stone has a direct and important influence on the quality of the finishing lime—its smoothness, plasticity, coverage, and the permanence of the finished job. Use Banner Lime, famous Ohio dolomite, manufactured by the most modern methods. National Mortar and Supply Co., Pittsburgh. Charter Member of the Finishing Lime Association of Ohio.



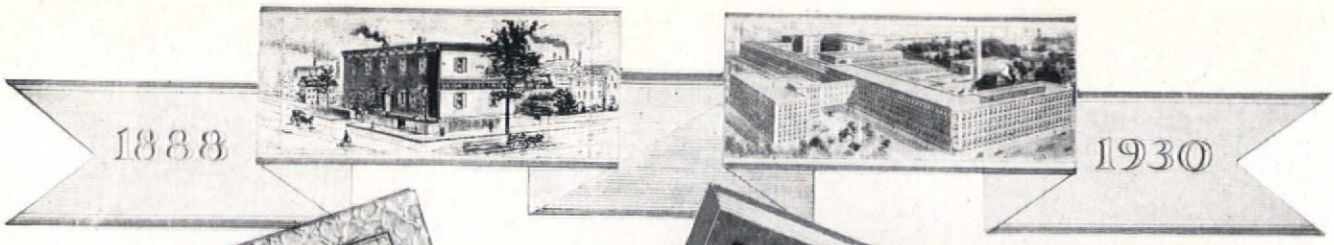
SACKS OF

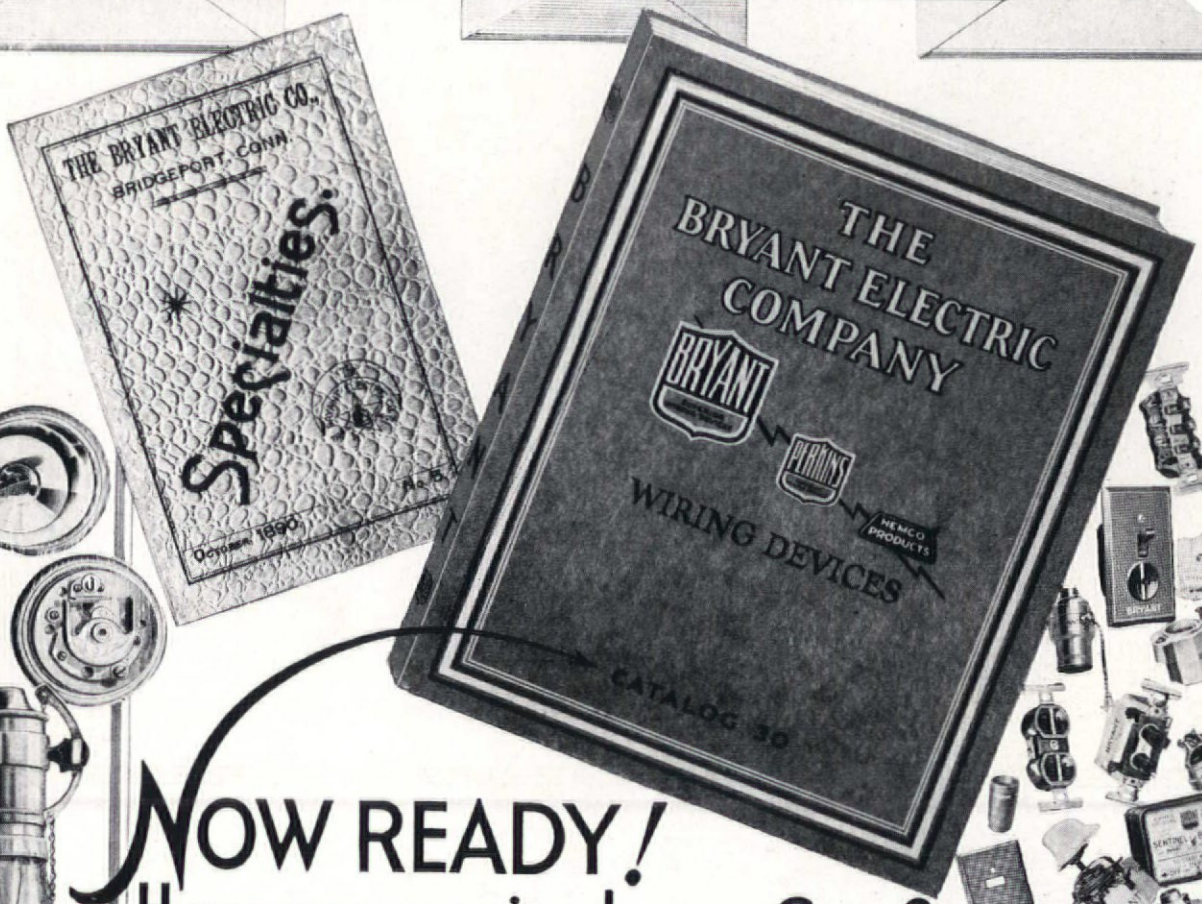
SATISFACTION



Banner Lime

FAMOUS OHIO FINISH

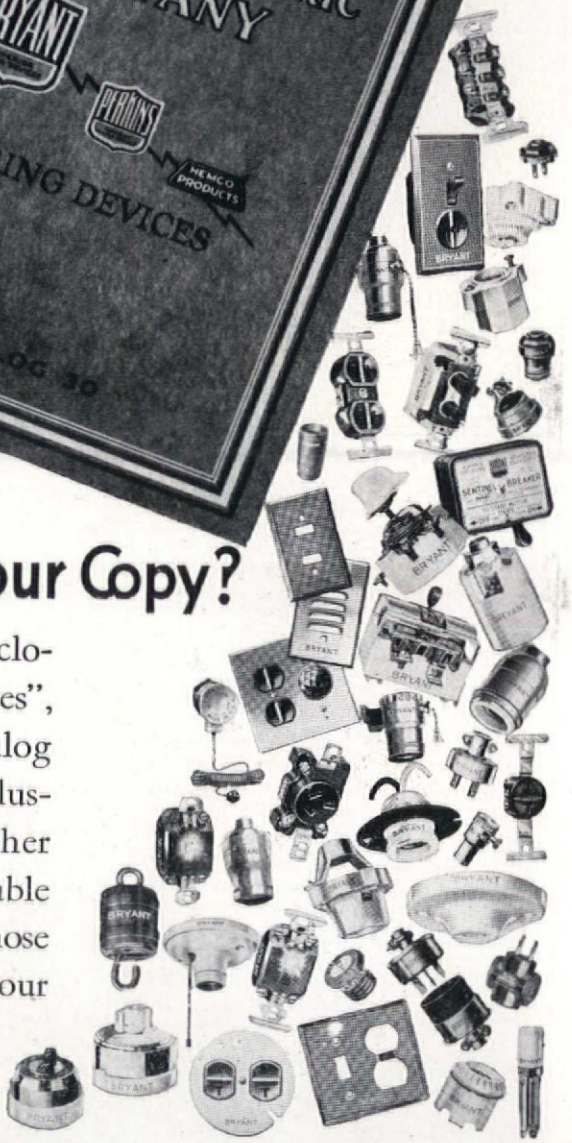




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The new Bryant catalog, an encyclopedia of "Superior Wiring Devices", is now being distributed This catalog contains complete information—illustrations, dimensional data and other essential matter—which will enable you to easily and accurately select those devices which are best adapted for your requirements. If your copy has not reached you, write us.

C-7



THE BRYANT ELECTRIC COMPANY

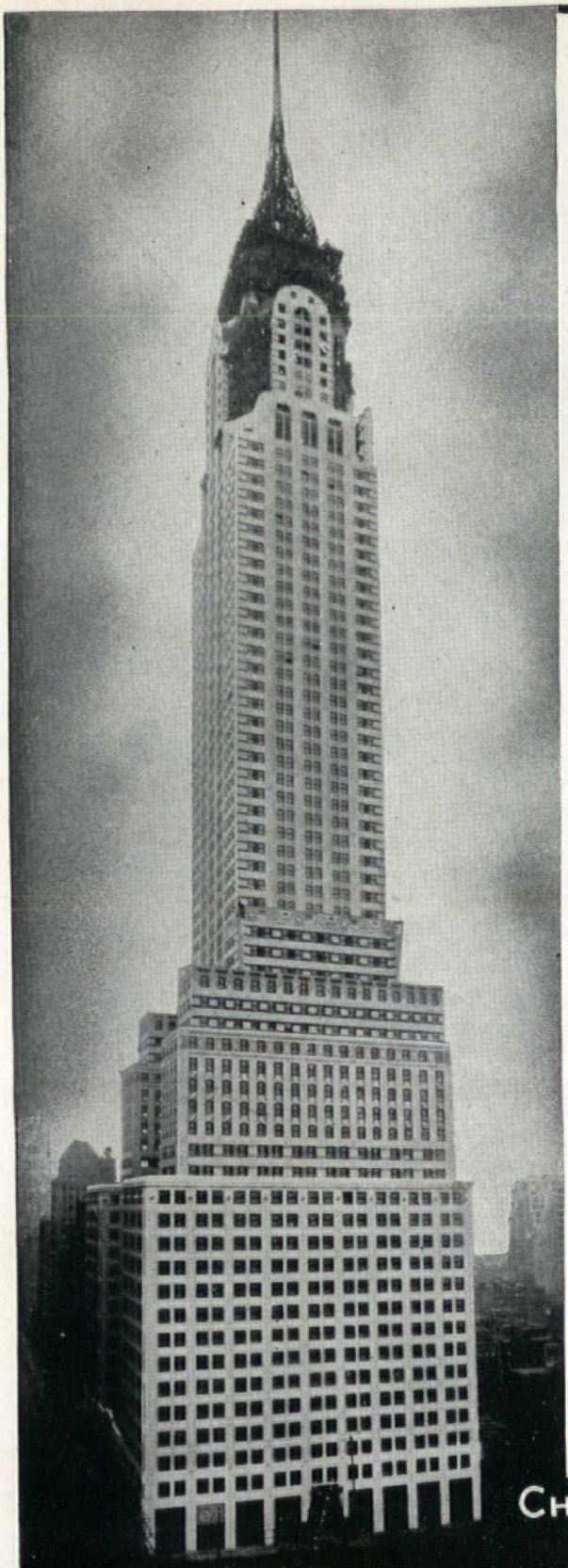
BRIDGEPORT CONNECTICUT, U.S.A.

BOSTON · CHICAGO · NEW YORK · PHILADELPHIA · SAN FRANCISCO

140 Federal Street — 844 West Adams Street — 60 East 42nd Street — Widener Building — 149 New Montgomery Street

BRYANT SUPERIOR WIRING DEVICES

MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888 - MANUFACTURERS OF HEMCO PRODUCTS



The *Chrysler Building*

. . . one of New York City's highest buildings, as it appeared on November 8, 1929, is another outstanding example of the satisfactory use of . . .

Structural Steel *for Building Construction*

which practice has been known for over forty years by Architects and Engineers, General Contractors and others interested in Steel Construction.

. . . .

The Structural Steel for this important building was fabricated by this Company from steel materials produced by Carnegie Steel Company.

We manufacture Steel Structures of all classes, particularly

BRIDGES AND BUILDINGS

Steel Towers for Electric Transmission, Steel Barges for Harbors and Rivers, Girders, Columns, Roof Trusses, etc., Turntables, (Continuous and Cantilever Types), Electric Furnaces (Heroult Type).

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Architect: Wm. Van Alen. Engineer: H. G. Balcom
Steel Fabricators: American Bridge Company
Steel Erectors: Post & McCord, Inc.
General Contractors: Fred T. Ley & Company

AMERICAN BRIDGE COMPANY

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General Offices: 71 Broadway, New York, N. Y.

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Boots?

of course not!



BECAUSE →



A Jennings SUCTION SEWAGE Pump is located outside the pit

You can forget your boots when inspecting it . . .

HERE'S a sewage pump that is always accessible. One that you can get at for cleaning or inspection without fuss or bother. Boots aren't necessary. There is no need ever to go down in the pit.

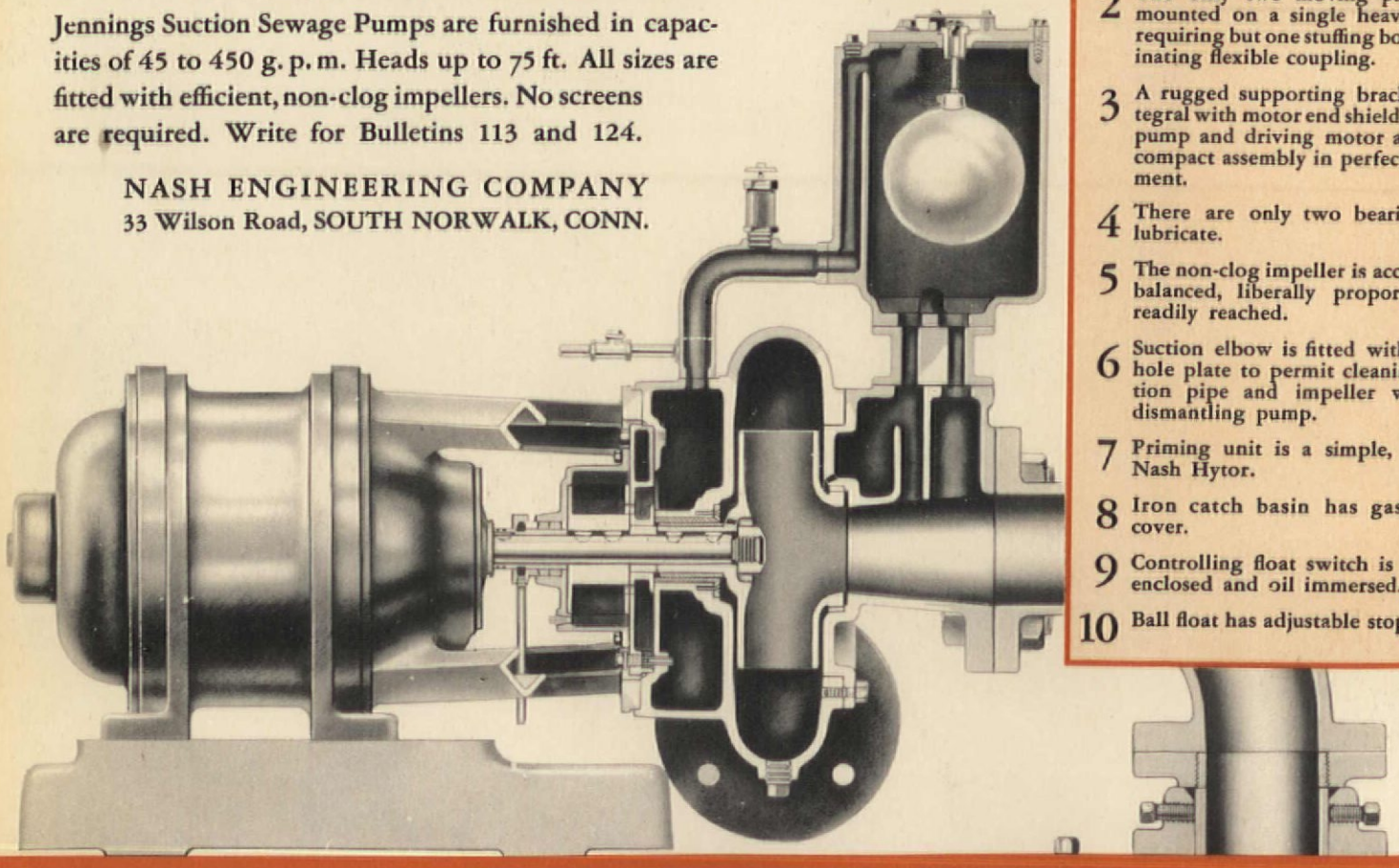
The Jennings Suction Sewage Pump is installed on the floor above the pit. Pump, motor and controls are right out in the open. A few minutes work with a wrench gives access to the interior. Impeller is removable without disturbing piping, packing or shaft alignment.

Jennings Suction Sewage Pumps are furnished in capacities of 45 to 450 g. p. m. Heads up to 75 ft. All sizes are fitted with efficient, non-clog impellers. No screens are required. Write for Bulletins 113 and 124.

NASH ENGINEERING COMPANY
33 Wilson Road, SOUTH NORWALK, CONN.

Note these 10 *features of Jennings Design*

1. Motor is commercial, ball-bearing type selected for dependability always available from stock.
2. The only two moving parts are mounted on a single heavy shaft requiring but one stuffing box, eliminating flexible coupling.
3. A rugged supporting bracket, integral with motor end shield, makes pump and driving motor a single compact assembly in perfect alignment.
4. There are only two bearings to lubricate.
5. The non-clog impeller is accurately balanced, liberally proportioned, readily reached.
6. Suction elbow is fitted with hand hole plate to permit cleaning suction pipe and impeller without dismantling pump.
7. Priming unit is a simple, sturdy Nash Hytor.
8. Iron catch basin has gas tight cover.
9. Controlling float switch is totally enclosed and oil immersed.
10. Ball float has adjustable stop.



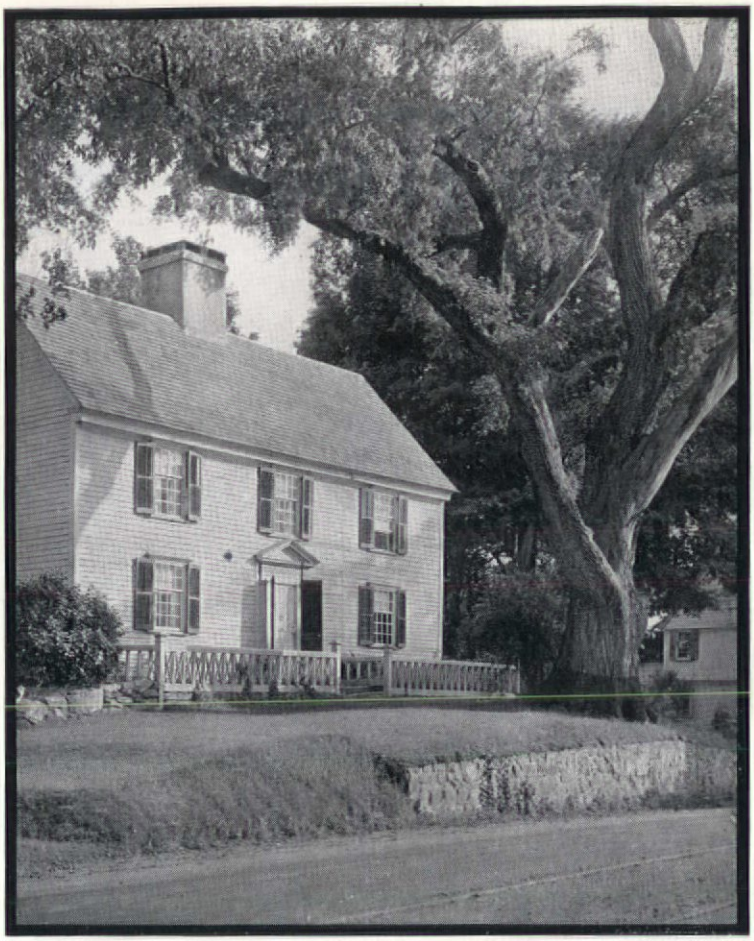
Jennings SUCTION SEWAGE *Pumps*

NASH ENGINEERING COMPANY SOUTH NORWALK, CONN., U. S. A.

The roadside, the trees, the

gracious friendly home . . . all are

UNCHANGED



The Ezra Griswold House, Guilford, Conn., built of White Pine in 1760 and standing today



THERE is quiet here and peace . . . the peace of things old and well-beloved. Trees that dapple the dusty road with shadows . . . the road, over which have passed the feet of generations. And softly enveloped in the calm of the country side, rests the old house—a home for generations.

If you were to walk down the elm-lined paths of a New England town, you would find other of these charming places. . . . Homes built when the country was finding itself . . . homes constructed by craftsmen who knew their work as few men have ever known it. It is not surprising to discover that almost all of these early dwellings were built of White Pine.

Today genuine White Pine may be selected for the houses that you design. Idaho (genuine) White Pine is nature's finest building lumber. Soft in texture, with a straight and delicately figured grain, it is easily worked. Paints, enamels, oils . . . whatever the treatment . . . provide a surface smooth with the sheen of satin, even and flat. And in spite of rain, and storm and cold, Idaho White Pine retains its luster, weathering with a beauty few other finishes approach.

Its durability and ease of working especially commend Idaho White Pine for remodeling purposes . . . when plans call for a sun-parlor . . . a dining-room, paneled in pine . . . book-shelves in the study. Whatever the work, whatever the architectural type, Idaho White Pine as a building material cannot be excelled. . . . Because of its low density cell structure, Idaho White Pine is a natural insulator.

The trade-mark, imprinted on Idaho White Pine, is your conclusive assurance that the wood is genuine. There is a difference. Specify it by name. Western Pine Manufacturers Association, Portland, Ore.

IWP *This trade-mark is printed on Idaho White Pine at the mills—and is a definite protection for home owner, builder, architect and lumber dealer.*

IDAHO (GENUINE) WHITE PINE



"Please REPEAT *that last sentence*"

Proper acoustical treatment banishes these conference-room interruptions

INTERRUPTIONS and misunderstandings are almost inevitable in rooms whose walls and ceilings absorb too little sound and reflect too much. Proper acoustical treatment is essential in the modern business room or office.

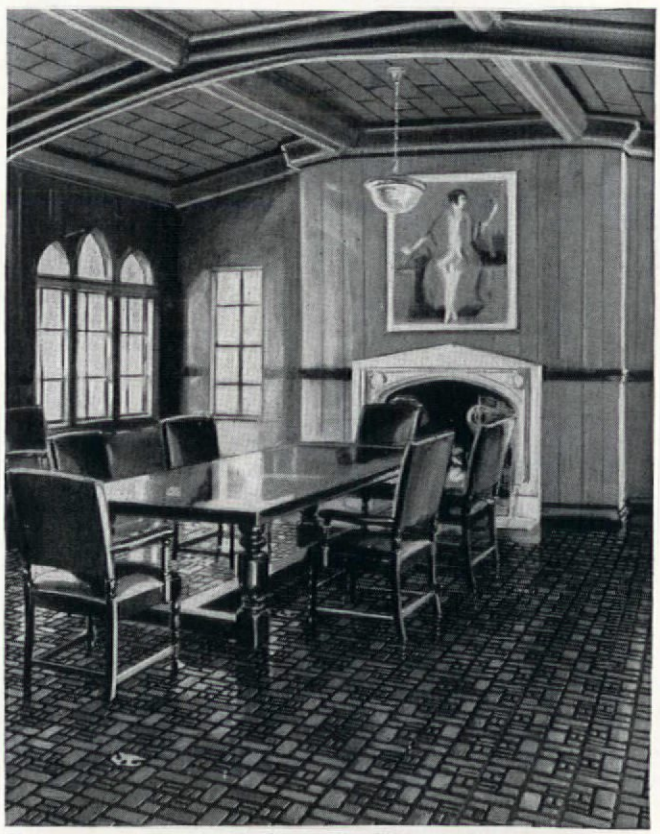
Excessive reverberation, echo, interference, and other acoustical defects are easily corrected. By the scientific placing of Armstrong's Corkoustic, sound can be controlled and made clear and distinct.

Corkoustic is an Armstrong product, made of pure cork. It has sound absorbence sufficient for the correction of any acoustical conditions. It has structural adaptability and strength, and will not warp, buckle, or sag. It is easily applied and requires no unusual preparation of building surfaces. It can be used in old or new construction.

Only the ingenuity of the designer limits the decorative effects to be obtained with Armstrong's Corkoustic. In its natural rich brown, it harmonizes beautifully with stained wood. Where color is desired, cold water paint can be sprayed on and beautiful effects are obtained with stencils. Corkoustic is made in various sizes, surfaces, and finishes, allowing a wide variety of design.

In addition to providing acoustical correction, Armstrong's Corkoustic affords highly efficient insulation for walls and ceilings. Corkoustic-lined rooms are cooler in summer and much more easily heated in winter. This is a feature of particular importance for all top-floor rooms and for churches and auditoriums with large exposed roof areas.

If you have ever asked yourself: "What shall I do about acoustical treatment?" we suggest that you permit our engineers to offer you the benefit of their experience and training. And for complete information about Armstrong's Corkoustic in business rooms, churches, auditoriums, theatres, and similar rooms, and also in shops, factories, and wherever workers are subjected to noisy surroundings, we'll be pleased to send you our illustrated book, "Acoustical Correction." Armstrong Cork and Insulation Company, 901 Concord Street, Lancaster, Pennsylvania.



The directors' room of Oneida Community, Ltd., manufacturers of the famous Community Plate. A ceiling of Armstrong's Corkoustic. It enhances the decoration in which the richness of dark wood panelling and beams sets the dominant note.

Armstrong's Corkoustic

for the acoustical treatment of all buildings

Behind the scenes . . .

where unseen factors carry on

Imprisoned behind walls of brick, stone and mortar are the arteries of a modern building charged with an important responsibility.

Month in and month out, year after year they must serve without interruption. Only good dependable pipe like "Spang" Welded Pipe assures this long satisfactory service. Down through the years its record of service in many of the nation's finest buildings speaks for itself.

If you too, would specify quality in your plumbing pipe—specify "Spang"—it pays.



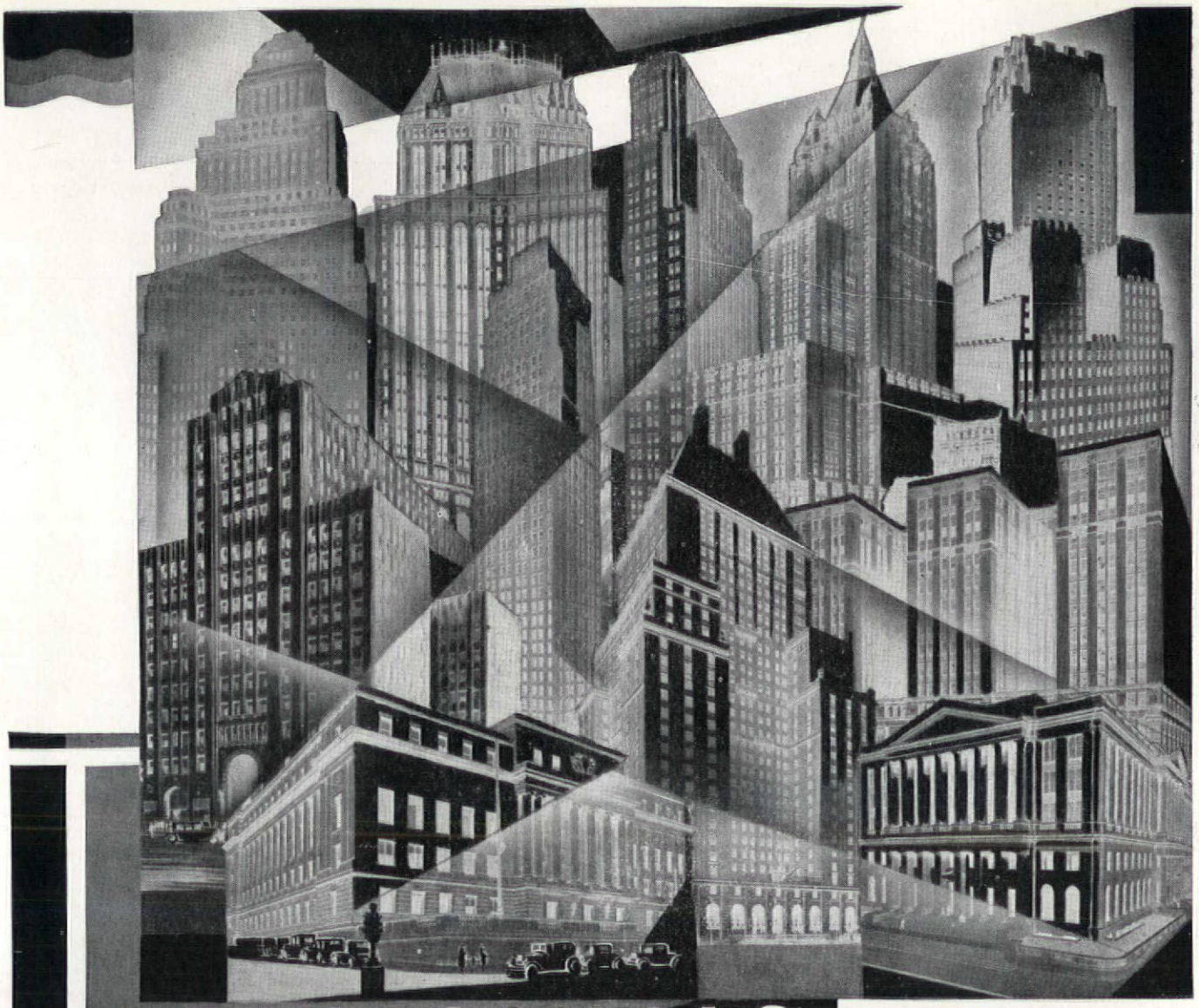
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San Francisco, Calif.

New York Life Insurance Co. Building
New York City, N. Y.

New York Telephone Co. Building
New York City, N. Y.

Maccabees Building
Detroit, Michigan

Essex County Hall of Records
Newark, N. J.

David Stott Building
Detroit, Michigan

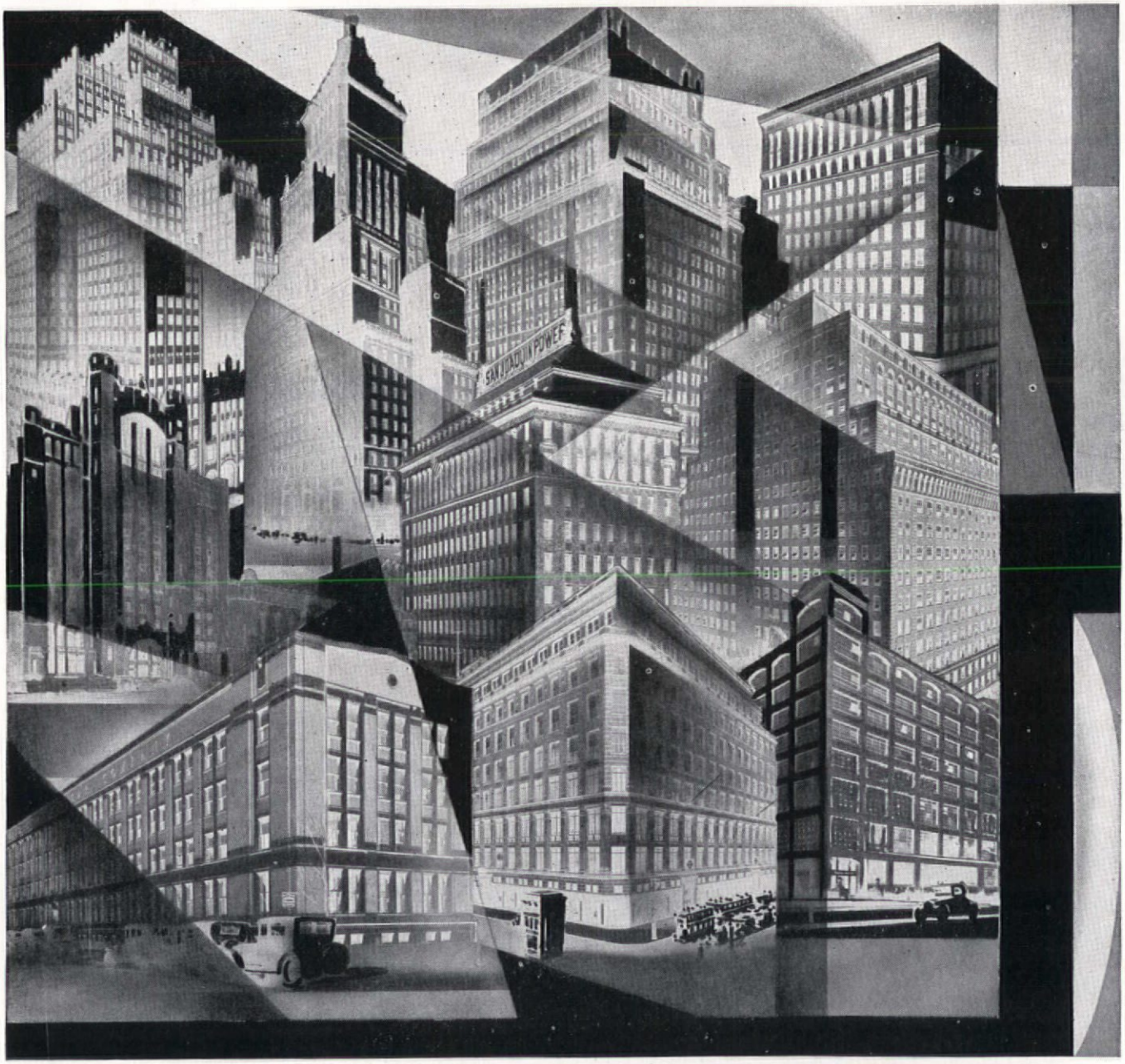
Savoy Plaza Hotel
New York City, N.Y.

Pennsylvania R. R. Building
Philadelphia, Pa.

Mutual Benefit Life Insurance Co. Bldg.
Newark, N. J.

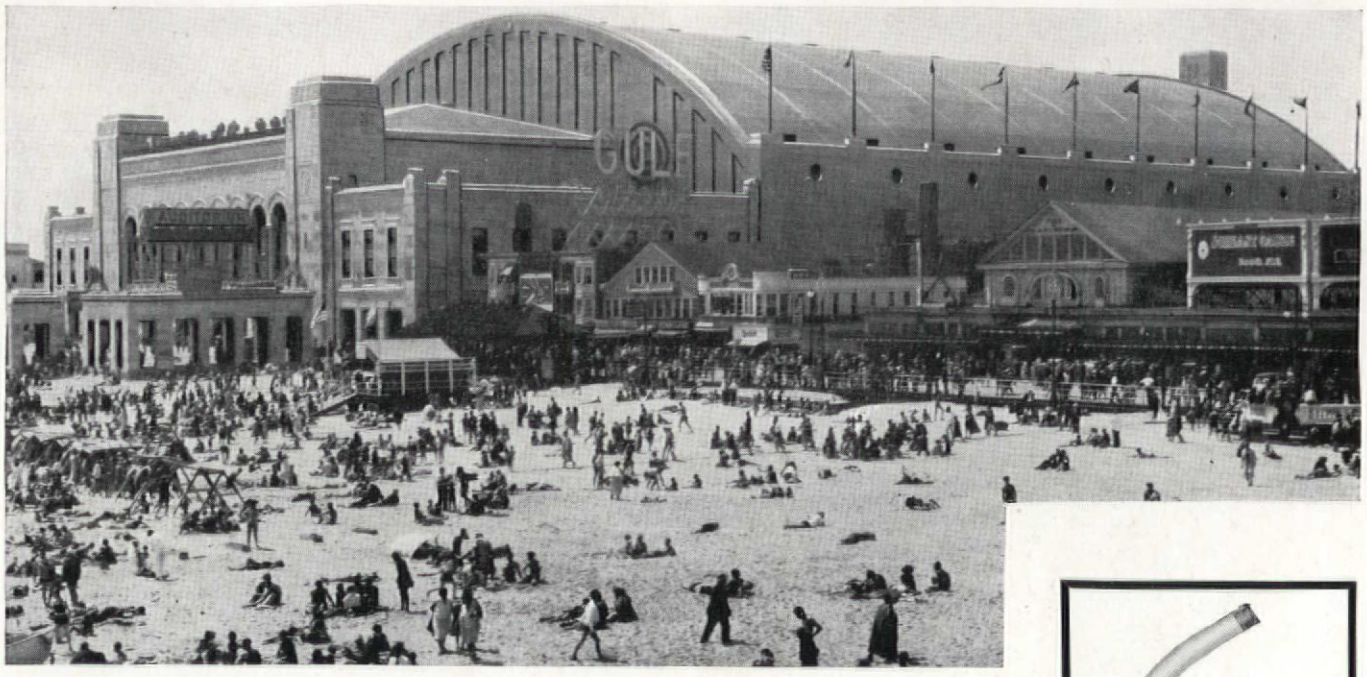
church fields standardized on these resilient floors—writing them into their specifications time after time? ¶ Service—that's the answer! And it covers both product-performance and installation-procedure. It means the kind of helpful, dependable planning and workmanship which only our experienced organization of authorized contractors can render. It means service in terms of floor quality, long life, economy. ¶ Let us tell you about our Guaranty Bond against repair expense. ¶ Let us send samples so that you may see the new Sealex Linoleums and Sealex Treadlite Tiles (cork-composition) which make our resilient floors—spot-proof, easy to clean.

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J. C. Penney Co. Inc., Building, New York City, N. Y.
Bank of Italy Building, Los Angeles, Calif.
Detroit Masonic Temple, Detroit, Michigan
Cadillac Motor Car Co. Building, Detroit, Michigan
San Joaquin Light & Power Corp. Building, Fresno, California
Saks 5th Avenue, New York City, N. Y.
Montgomery Ward & Co. Building, Oakland, California

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Corrosive salt sea air, humidity, age have little effect on electric wiring in Atlantic City's great Auditorium. Electric lines throughout this vast building serving throngs every year are carried in "G-E White," the conduit made to *endure.*

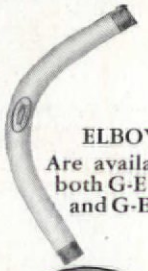
"G-E White" can be depended upon anywhere because it defeats rust . . . defies time.

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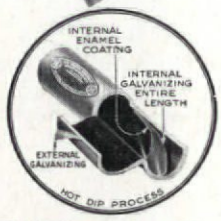
During installation it works easily, without scuffing the zinc, without cracking at sharp bends. Smooth, clean interior surfaces make wire pulling easy.

The same superior tubing enameled inside and out . . . uniform, every inch . . . is "G-E Black." Its enamel is tough and elastic . . . withstands abuse.

G-E Rigid Conduit of either type makes wiring *permanent.* You can get it anywhere from G-E Merchandise Distributors—or write Section C157, Merchandise Department, General Electric Company, Bridgeport, Connecticut.



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Are available in both G-E White and G-E Black.



G-E White—Stripped View



SERVICE NIPPLES
Quantity Production makes the cost low.

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They're "Life Savers" for men on rush jobs.



These Fittings Simplify Installation

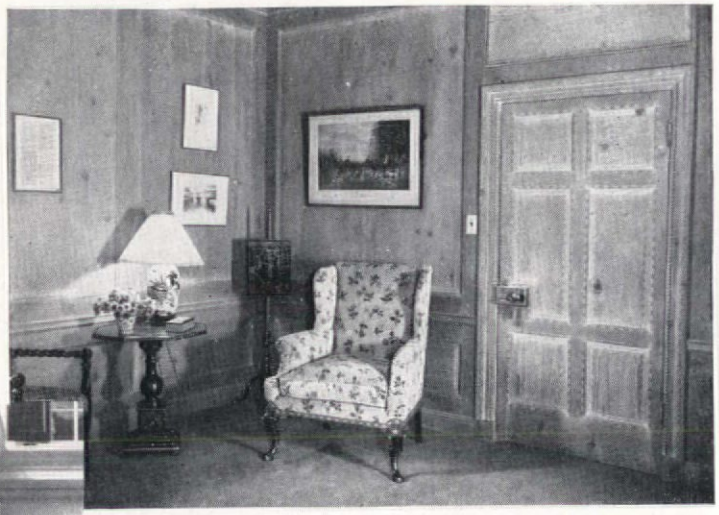
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In return for overwhelming preference for wood houses, the National Lumber Manufacturers Association sponsors lumber which assures the fulfillment of specifications.

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If you are faced with any construction problem, let the National Lumber Manufacturers Association help you. Expert in every phase of lumber technology and engineering methods, the services of a technical staff are offered you free of charge or obligation.

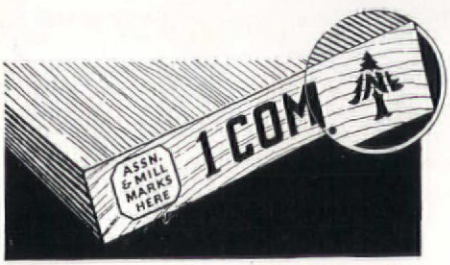
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-tested by time

Northern Life Insurance Company Tower, Seattle, Washington . . . An outstanding example of present-day architecture . . Lime-cement mortar changed in color from heather brown at bottom to cream tan at 27th floor, to conform to color grading of the brickwork . . . A. H. Albertson and Associates, Architects.

LIME « « For Non-Staining Masonry Walls

WHEN a combination of good architectural design, high-grade workmanship and the use of first-class building materials produces such beautiful and outstanding structures as the Northern Life Tower, illustrated above, why run the risk of obtaining results which are not pleasing?

Many similar structures are marred by the presence of staining or efflorescence on the exterior masonry walls. Efflorescence is caused by certain soluble salts present in masonry units and mortar materials, which salts are carried to the surface by rain water entering through leaky walls. It becomes noticeable as a white scum which forms on the exterior surface of the walls when the solution of the salts becomes supersaturated, and crystallization occurs due to evaporation of the water.

The best and surest way to prevent this undesirable appearance is to construct permanently waterproof building walls. The history of mortars, and recent authoritative tests, both show conclusively that masonry walls sufficiently waterproof to prevent efflorescence are obtained only through the use of mortars rich in lime.

Full details on this important subject will be found in our new booklet, "Mortars and Masonry." Write for your copy.

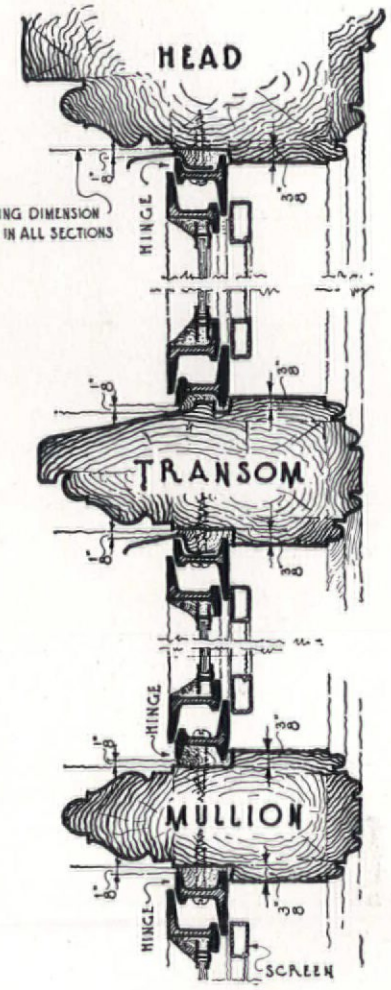
NATIONAL LIME ASSOCIATION

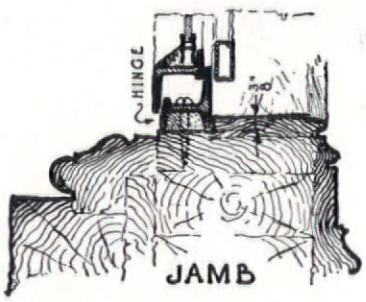
An organization of leading lime manufacturers formed to encourage a better appreciation of the economic value of lime in all its uses.

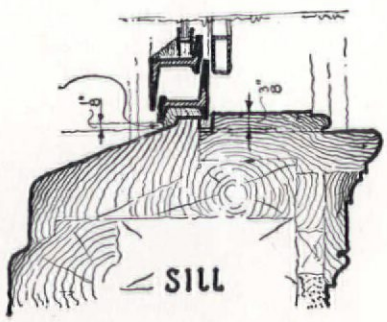
41-A

713 PHILLIPS BUILDING « WASHINGTON, D.C.









SECTIONS THAT FAVOR LEADED GLAZING

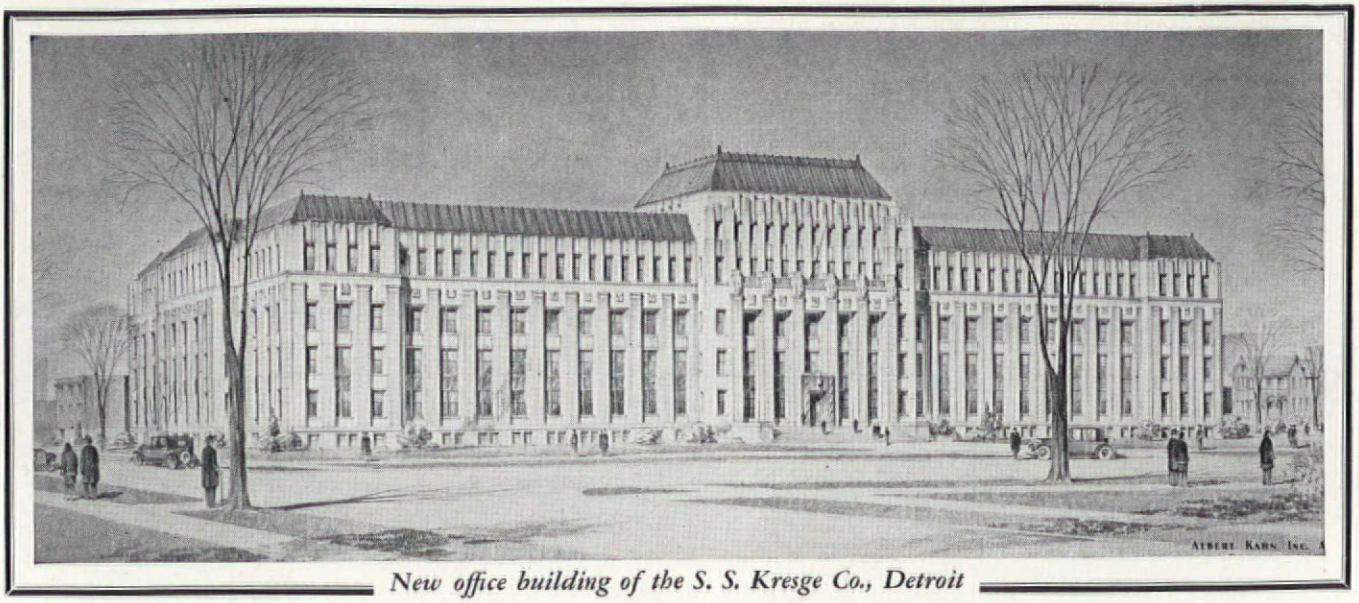
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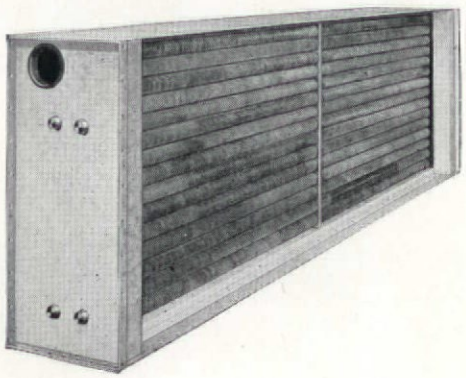


New office building of the S. S. Kresge Co., Detroit

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ANOTHER modern building has selected modern ventilating equipment—Encased Arcoblast Heaters. The unusual design of Encased Arcoblast gives exclusive advantages. Its light weight makes it possible to install in almost any kind of building, and its design —¾ inch copper tubes with spirally wound fins secured into specially shaped cast iron headers—gives good thermostatic control. The galvanized encasement is complete and ready for pipe connections. There are no soldered steam backed joints—it is built for steam pressure, from 5 to 200 pounds.



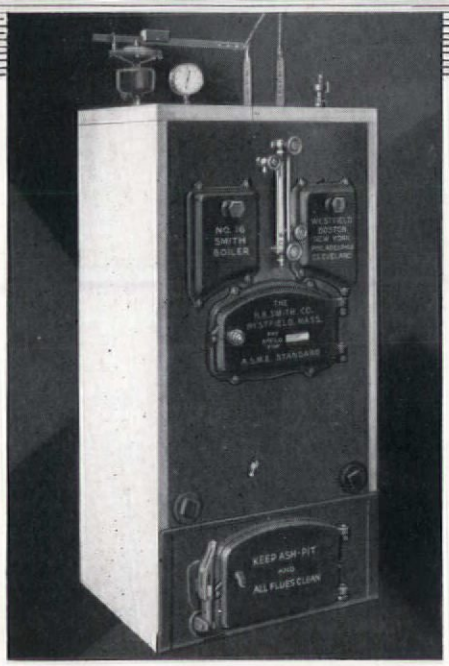
We will be glad to send you complete information and engineering data.

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The New Smith "16" has more Fire Surface than any other boiler made of the same grate area, and twice as much as some of them. It is especially adapted for use with oil and gas burners.

For complete information write for a free copy of our booklet, "The Smith 16". Address: The H. B. Smith Co., Dept. E-51, Westfield, Mass.

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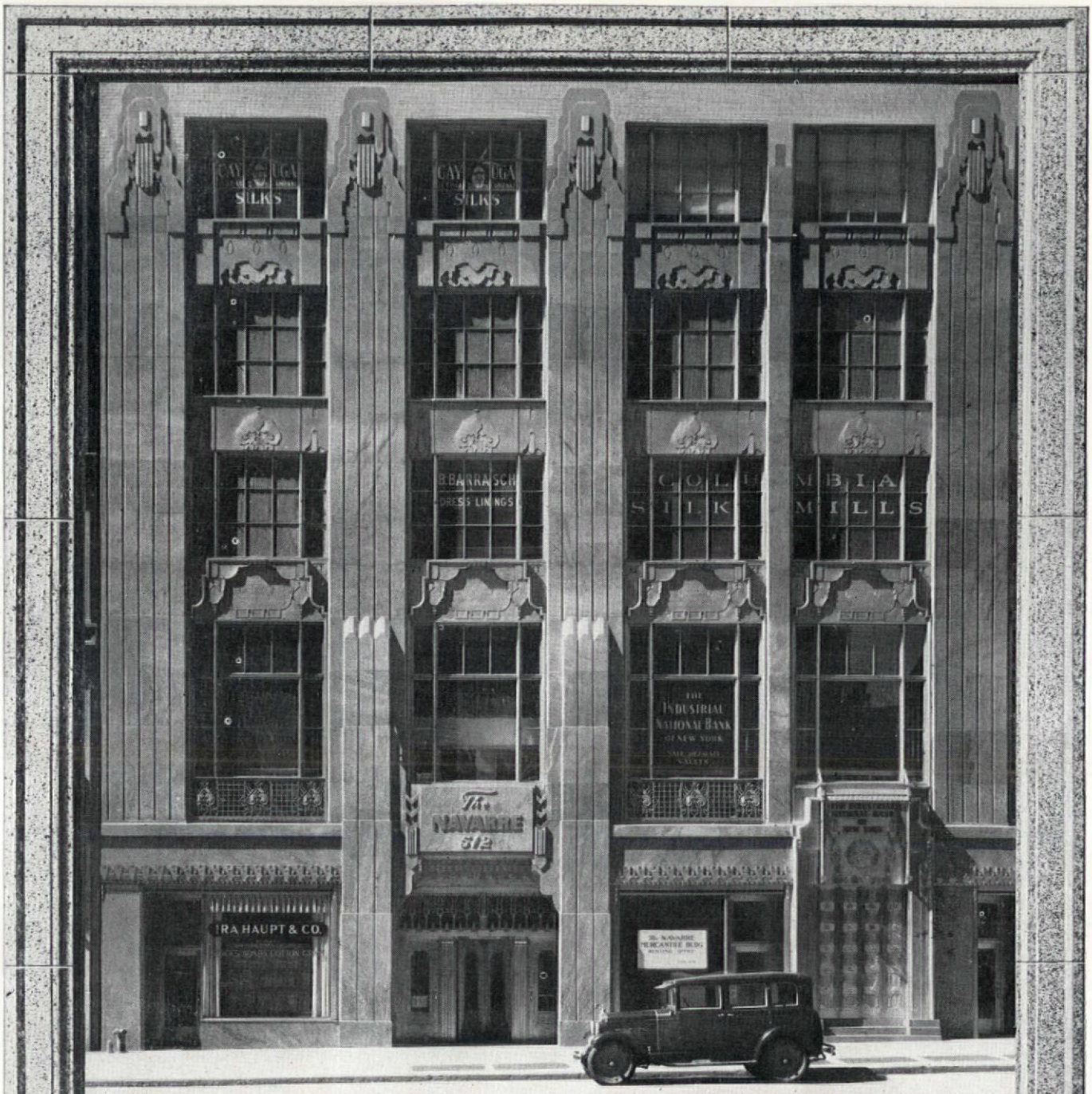
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38th St. & 7th Ave., New York City
Sugarman & Berger, Architects

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National Building Granite Quarries Assn.

31 STATE STREET BOSTON, MASS.

H. H. Sherman, *Secretary*

GRANITE

A PREVIEW OF THE AUGUST ISSUE

The University Bridge at Philadelphia

As a bridge designer the architect invades what has been almost exclusively the province of the structural engineer, a field that is primarily utilitarian and with requirements that are entirely different from those of buildings. In this bridge the designer, Paul P. Cret, architect, gives his interpretation of bridge design as an architectural problem.

•

A Compact Loft Building

This building by Victor Mayper, architect, may be taken as the typical solution of the loft building. It is subdivided with a minimum waste of cargo space, and utilities occupy a minimum of floor space.

•

Notes on Drafting and Design

Constantly new ideas in design and time saving methods of producing drawings are being developed. In this issue we are illustrating various "kinks" in the design of banks which certain bank design specialists discovered by years of experimentation. We also include information on the design of doors in domestic and public buildings, and a discussion of ways to place windows so as to attain the maximum of light.

•

How Small a House?

The minimal house—the dwelling unit which will satisfy on a minimum of floor space the maximum requirements of a modern household—was the chief topic of discussion at the Frankfort Congress of Modern Architecture. Among the solutions submitted was this scheme by Le Corbusier and P. Jeanneret of Paris, outstanding because of its efficiency in combining the functions of rooms so that they serve one purpose by day and another by night. It offers a pertinent application to the planning of American apartments.

Week-End Houses and Sports Cottages

The increasing popularity of the summer camp, the week-end house and the sports cottage means more than a sentimental "back to nature" fad. They enable the city dweller to preserve the direct contact with nature that is a necessary condition for a sound society. This study of the vacation house, by Mr. K. Lönberg-Holm, presents the most recent data on the design and construction of the shelter.

•

In addition to a portfolio featuring views and layouts of various architectural offices, there will be published photographs and descriptions of new projects and buildings. Among these are the First Baptist Church of Asheville, N. C., by Douglas D. Ellington, architect, and a country house at Johnstown, Pa., by Frank Forster, architect.

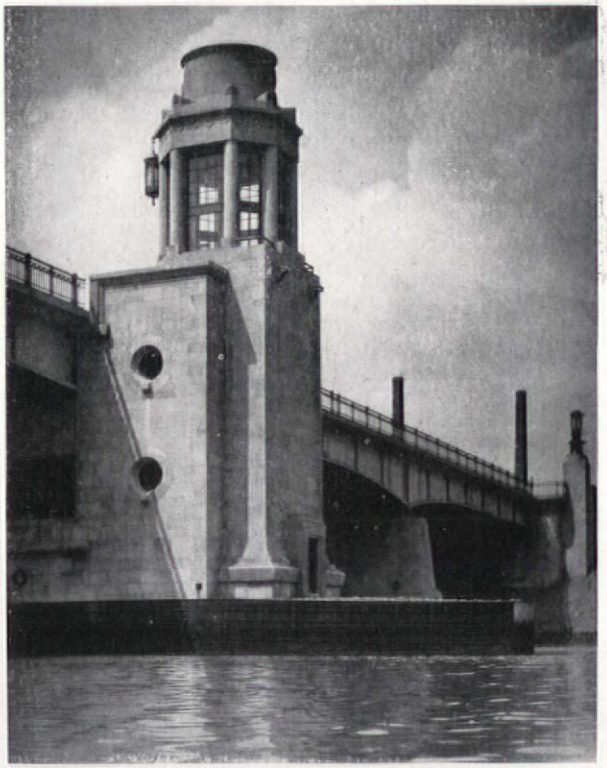
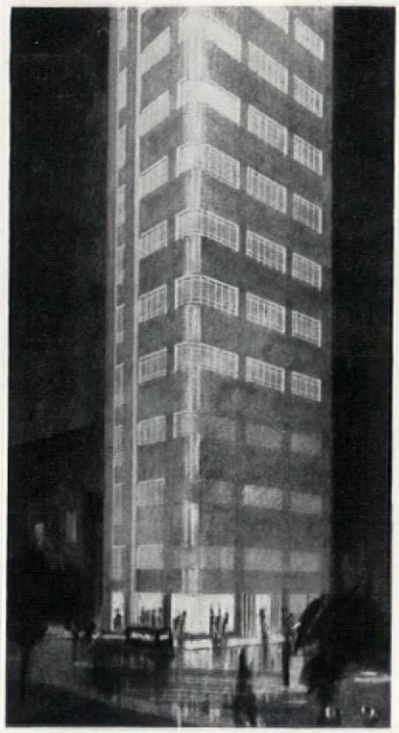


Photo. Rittase

THE UNIVERSITY BRIDGE AT PHILADELPHIA

PAUL P. CRET, ARCHITECT

THE ARCHITECTURAL RECORD



DETAIL FROM PRELIMINARY SKETCH
APARTMENT IN CHICAGO
BOWMAN BROS., ARCHITECTS

FEATURES OF THIS ISSUE

Of technical interest to the architect and which may serve well for reference use on the drafting table, the editors wish also to call attention to these features in this issue:

Notes on Drafting and Design, which include a comprehensive procedure for the design of tubular steel flag poles;

Details of Current Architecture;

The Problem of Making Brick Walls Watertight, prepared by Mr. Stanley Newman, a specialist on this subject, analyzing the causes of leaks and offering recommendations which affect specifications and construction methods;

Theatre Acoustics, Ventilating and Lighting, which brings forth the latest data on these topics and supplements a Technical News study of the theatre appearing in the May issue.

A PIONEER: THE ALL-METAL APARTMENT HOUSE

In the American skyscrapers, brought into existence by the strength of steel, we have seen of late an increasing use of aluminum and stainless steel for the spandrels. The new Chrysler, Empire State, and Hollander Buildings, New York City, have metal spandrels; backed with brick, the metal is decorative rather than functional and the advantages of a thin wall have been offset. Nevertheless, the metal spandrels have been indicative of the trend toward a new construction—they are the transition.

Now, with a rapid stride forward, we come upon a building which will have for the first time in America a construction entirely of metal and glass—an apartment house designed by Bowman Brothers, architects, and shortly to be erected in Chicago. Ground will be broken for the building in October, according to a letter just received from the architects.

The project is presented as the news feature of this issue with a full description of the construction and a complete analysis of its costs and economic importance.

In its economic potentialities, with a cutting down of erection costs, head loss, excess weight and wasted space, and with an increase of rentable floor space, the metal construction promises much for the investor. On a comparatively small ground plot such as this particular apartment house possesses, the increase of rentable floor area may be so proportionally high that the increased return on the equity will induce a hesitating builder to build. Here, it is felt, by pointing out to clients the possibilities of increased income from such construction in metal there is an opportunity for the architect to stimulate his own business.

As a pioneer of the new type the building deserves the attention of the historians. The use of metal construction means the evolution of new designs: obviously the forms that gave character to brick and masonry would be illogical and absurd if translated into metal. New building forms, expressive of the new medium, are inevitable.



A TRUMBULL INSTALLATION

Fidelity-Philadelphia
Trust Company Building,
Philadelphia, Pa.

SIMON & SIMON of
Philadelphia, Architects

Architects may be interested to know that complete "Circle T" Trumbull installations, including Panelboards, Switchboards and Switches of various types, are to be found in thousands of the best buildings erected in all parts of the country. "Circle T" Trumbull engineers gladly cooperate with architects and engineers in suggesting practical layouts. On request, copies of these publications: Safety Switches; Trumbull "Controlite"—Theatre Switchboards; Flex-A-Power—The Convenience Outlet for Power in Industry; Trumbull "Cheer"—A monthly publication of the Trumbull line; our new BUSS-WA Bulletin, on the copper bar system for power and light distribution.

All of the panelboards installed in the Fidelity-Philadelphia Building, with their enclosing steel cabinets, were furnished by the Trumbull Electric Manufacturing Company and sold through the General Electric Company.

Of the eighty panelboards installed for power and lighting, totalling approximately 2,400 circuits, practically the entire amount were of the metering type for lighting distribution. These metering panels were of the so-called meter bar type arranged for 3 phase, 4 wire distribution. Each panel was arranged so that any circuit could be placed on any meter bar without the necessity of making changes in any wiring connections. The metering panels were all of large size, consisting of a meter bar section, a meter loop section and then two meter compartments, one at the right and the other at the left, for housing the various meters.

Fifty-two of these panels were installed, totalling 1,772 circuits. Practically each one of these lighting cabinets measured over six feet square.

See the Trumbull "Circle T" catalogue in the new 4-volume Sweet's, Vol. D, pages 5164-5165.

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ATLANTA



The record of four heating seasons shows a consistent FUEL SAVING of 32% *in the* Barry Apartments, Chicago

IN 1926 the vacuum return line heating system of the Barry Apartments was changed over to operate as a Dunham Differential System. From December 1, 1925, to April 30, 1926,* the season prior to the change, fuel cost was $5,733.

Operating records for corresponding periods (December 1 to April 30) during the next four heating seasons under Differential System operation show an average fuel cost per season of $3,885. The average saving per season is over $1,800.

The season just ended (December 1, 1929 to April 30, 1930) again demonstrates the consistent, economical operation of the Differential System. Fuel cost was $3,724.

The Barry Apartment building is only one example of the many change-over installations where Differential System fuel savings quickly pay their cost and then go on returning consistent, large dividends year after year.

Find out what Dunham Differential System fuel economy means to you in dollars and cents. Dunham engineers will survey your present system and give you reliable estimates of the operating economies possible.

Many existing heating systems can be converted to Differential operation at moderate cost. Arrangements may be made for funding the cost of change-over to Differential heating. The fuel savings meet the payments required. Dunham engineers will survey present systems without obligation.

» » » »

*Records are not available for the 1925-26 season prior to December 1, 1925. The figures for the following years are for the same periods, December 1 to April 30, so as to secure a direct comparison of fuel cost.

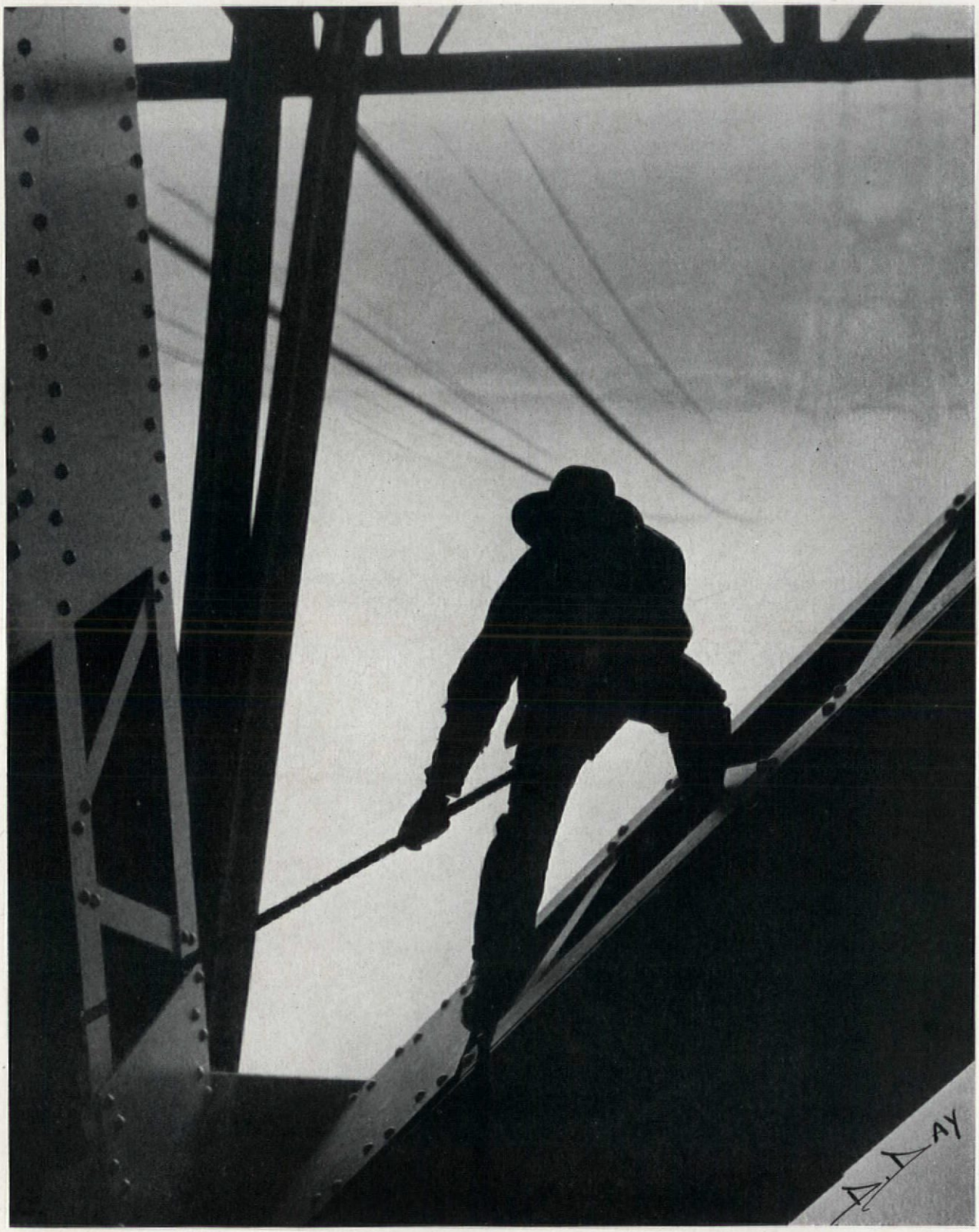


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STRINGING THE CABLES ON THE NEW HUDSON RIVER BRIDGE

THE ARCHITECTURAL RECORD

AN ILLUSTRATED MONTHLY MAGAZINE OF ARCHITECTURE & THE ALLIED ARTS & CRAFTS

VOLUME 68 • JULY • 1930 NUMBER 1

THE FIRST ALL-METAL APARTMENT HOUSE

LAKE FRONT BUILDING, CHICAGO
BOWMAN BROTHERS, INC., ARCHITECTS

INCREASED RENTABLE AREA—INCREASED PROFIT TO OWNER

A PROBLEM OF RENTABLE AREA

To build an apartment house which will have the maximum usable floor area and number of floors compatible with livability, economy and the building code.

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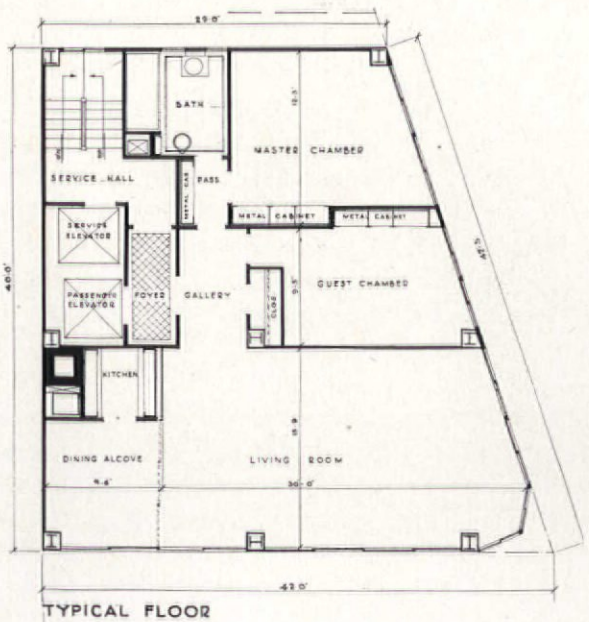
A SOLUTION IN METAL CONSTRUCTION

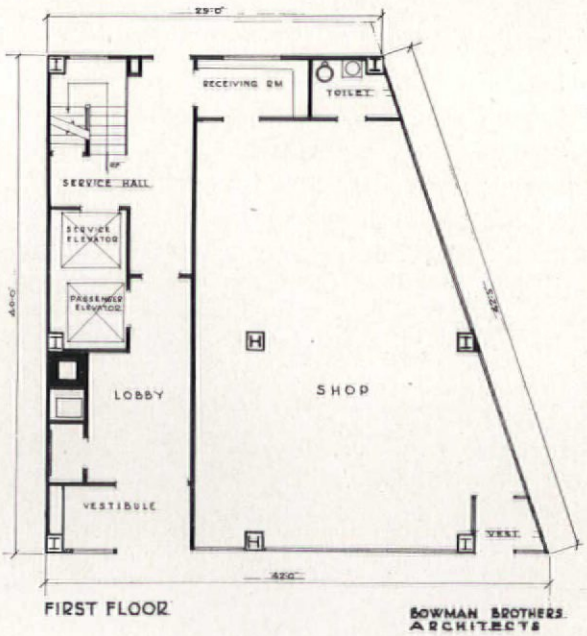
Insulated metal walls which increase the net floor area, decrease the heat loss and cost less than masonry; battledeck floors which permit the addition of another floor and still keep within the height limit of the zoning ordinance. The reduction in heat loss through insulated walls and double windows and savings in construction cost permit the inclusion of such additional features as electric heat and other special equipment.

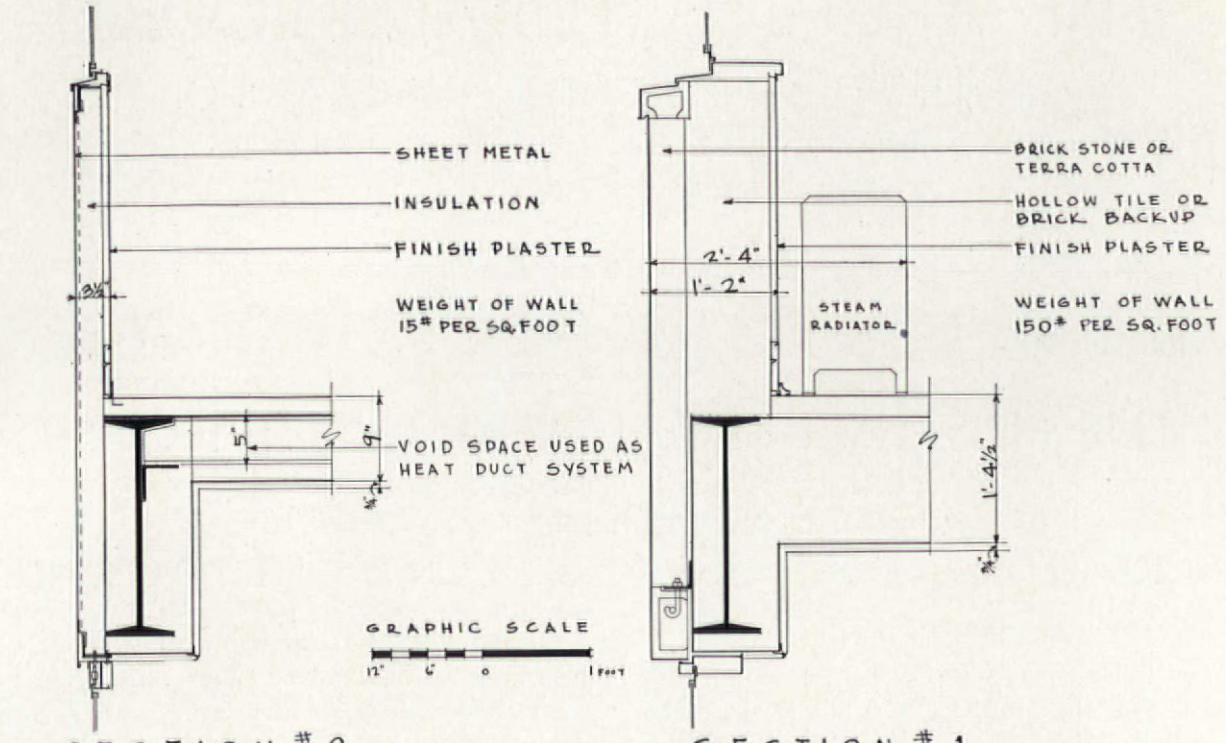
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METAL WALLS

In order to increase the usable floor area, decrease the dead load of the walls, increase the heat insulation value of the ex-







METAL WALL INCREASES NET FLOOR AREA

terior wall, eliminate trouble from leaking walls and at the same time reduce the first cost of the building, the wall shown in the accompanying drawings was developed.

A. SPACE SAVED

Section No. 1 shows the old type of masonry wall construction occupying 14" of space along the perimeter of the building. Section No. 2 shows the new type of metal wall construction which occupies only 3½" of the space along the perimeter of the building.

AREAS FOR LAKE FRONT BUILDING

Areas	*Masonry Walls*	*Metal Walls*
Non-Rentable Area*		
Ext. Walls.....	179 sq. ft.	44 sq. ft.
Balance.....	276 sq. ft.	276 sq. ft.
Net Rentable.....	965 sq. ft.	1100 sq. ft.
Gross.....	1420 sq. ft.	1420 sq. ft.

* Non-rentable includes elevators, stairs, public halls, chimneys, air ducts, columns, partitions and exterior brick walls.

The savings** through using metal walls is 135 square feet or 14% of the net rentable area if it were built with brick walls.

B. INCREASED INCOME

A decrease in the thickness of the exterior walls of a building means an increase in floor area. In the case of a building with a comparatively small ground area this increase will be a large percentage of the net rentable floor area, which will represent a greater return to the owner in inverse ratio to his equity. The larger the plan area the less will be the percentage of increased return on the equity.

Applying this method to an office building of same area and shape renting at $4 a square foot, the rent with the masonry walls would be $3,860 a year whereas with metal walls the rent would be $4,400, an

** Brick Wall 1'-2" x 153' = 179 sq. ft.
Metal Wall 3½" x 153' = 44 sq. ft.

Saving 135 sq. ft.

increase of $540 or 14% on the gross income for each floor. As a matter of fact the metal walls will cost less as shown later.

This increase of 14% in the income of the entire building will represent an additional net income on the equity of 56%, if the equity is assumed at one-fourth of the total cost of the project.

This is an exceptional case; in the ordinary office building the increase in net rentable floor area for a larger ground plot would not ordinarily exceed 3%. This would represent an additional net income on the equity of approximately 12%, assuming that the equity is 25% of the total project cost.

C. WALL CONSTRUCTION

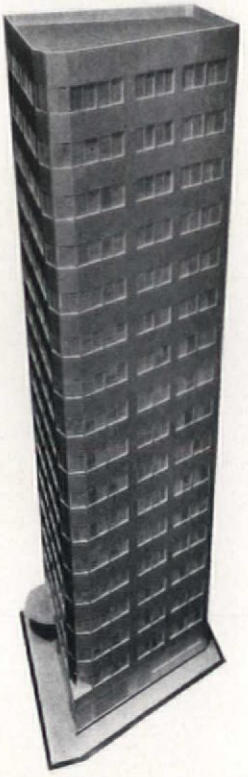
An analysis was made of different types of metal walls including:

I. A wall built of sheet aluminum with aluminum framework within, waterproofed and insulated, etc.;
II. A wall built of sheet aluminum with steel framework within, waterproofed and insulated, etc.;
III. A wall built of Allegheny Metal "KA2" (not to be confused with stainless steel "Ascoloy" which is the name given to chromium steels without a nickel content).

A wall built of "Ascoloy" sheets with steel framework within, waterproofed and insulated, was discarded because of the cost of the necessary maintenance. Steel sheet was also considered instead of "Ascoloy" but was discarded because of the cost of necessary maintenance.

Other metals were also included but are not interesting because of their high cost or lack of practicability.

In each case these metal walls were designed as slabs where the live load was represented by the wind load. The thickness of the metals was varied according to respective tensile strengths and designed by the deflection formula. A large factor of safety was allowed to take care of intangible items, such as vibration and shivering under a high wind, denting, etc.

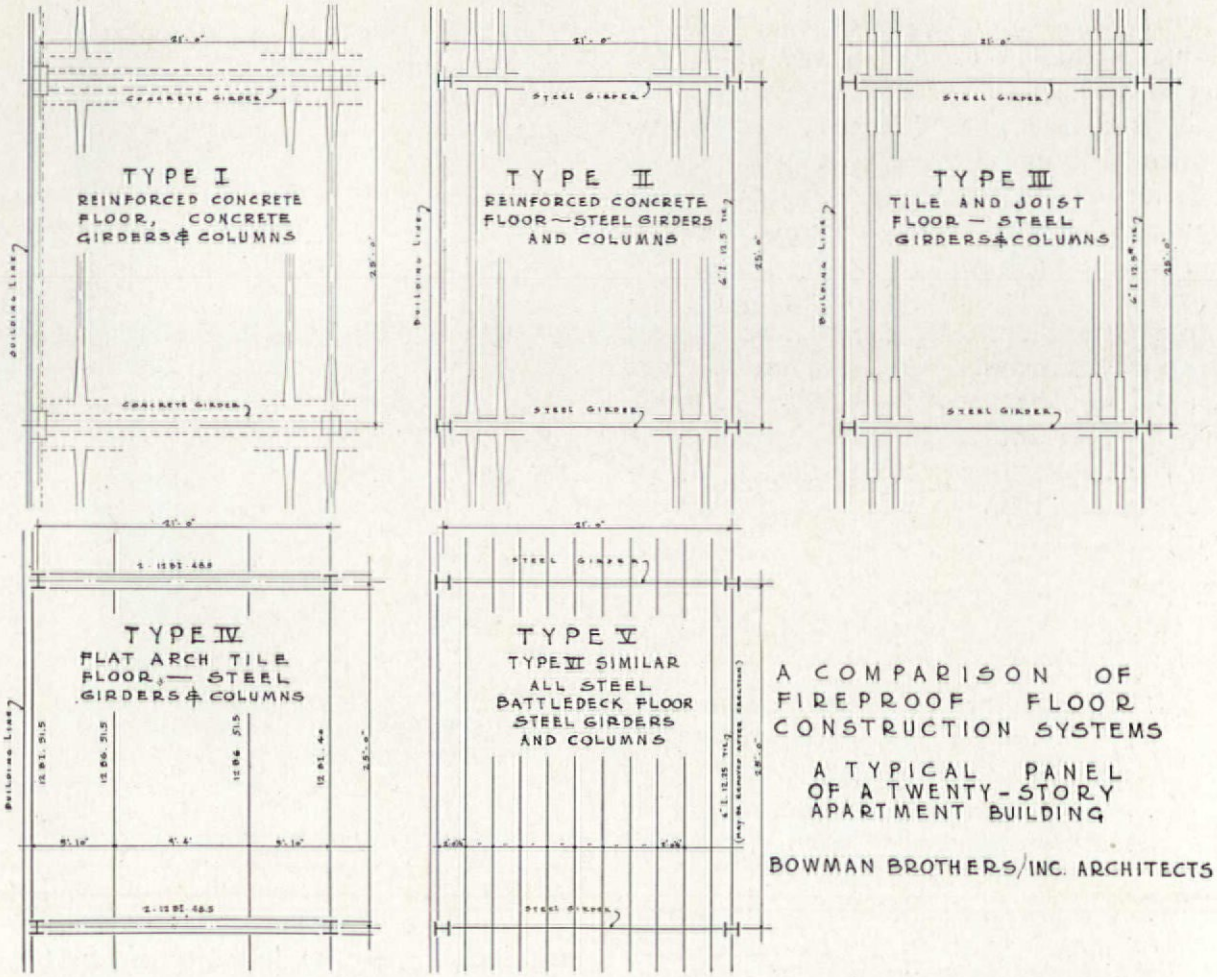


MODEL OF ALL METAL APARTMENT HOUSE
BOWMAN BROTHERS, ARCHITECTS

The method of fastening was a problem. Riveting the sheets was discarded as impractical, due to the difficulty of matching holes in sheets to holes in the framework of the wall. Welding was also discarded as being too costly and actually not necessary. The method which proved to be the most practical from the standpoint of good construction and economy and erection time was clamping the sheets to the framework with straps, all edges having been formed in the shop to permit lock-seaming.

Allegheny metal, which was selected for the wall, does not require paint or maintenance of any kind for at least thirty years. This wall will cost for metal in place approximately $1.20 a square foot, plus $.16 for insulation, plus $.17 for metal lath and plaster, or a total of approximately $1.53 a square foot of wall surface which is less than masonry wall ($2.17 a square foot) with waterproofing, furring, lath and plaster.

It must be kept in mind that the above described metal wall is equivalent to a 36"



brick wall in heat insulation value and if the cost of a 36″ brick wall (stone facing) were compared with the above metal wall a still greater difference would be apparent. Or by adding the cost of 2″ of insulation to the 12″ stone wall with brick backup, a fair comparison would be made.

The time saving effected by the use of a metal wall is considerable and must be taken into account. Furthermore, the maintenance of stone walls (tuck-pointing, cleaning, etc.) is costly, whereas the metal wall requires none.

D. INSULATION

The metal wall is to be backed with 3″ slabs of rock wool. This material should not be confused with mineral wool which will compress under vibration, or blocks composed of mineral wool held together by asphalt compounds which will disintegrate or settle under heat and jarring. Rock wool will not disintegrate or settle at any temperature between 40 degrees below zero to 1,250 degrees Fahrenheit. Its coefficient of conductivity is .27 B.t.u.* (approximately the same as cork board) and it weighs 12 pounds a cubic foot. The overall conductivity of the wall with metal face, 3″ of rock wool and interior plaster, will be approximately .09 B.t.u. an hour per square foot. This is roughly equivalent to a brick wall 36″ thick.

•

FLOOR CONSTRUCTION

An analysis was made to find the best type of floor, giving consideration to cost, space occupied, length of time required for construction, and sound insulating factors.

•

COSTS

To arrive at accurate floor construction costs, the architects, in cooperation with

* A.S.H.V.E. Guide 1930. Page 23.

engineers, designed one panel of a building in six different types of construction. The types were as follows:

•

Type I. Reinforced concrete floor, girders and columns. (10 plus 2½, 6″ joists at 36″ cts., widened to 10″ at ends. Plaster ceiling included.) The cost of this system was only $1.17 a square foot but its dead load weight of 64 lbs. required columns of excessive size and for this reason was discarded as being impractical.

•

Type II. Reinforced concrete floor, steel girders and columns. (10 plus 2½, 5″ joists at 25″ cts. widened to 9″ at ends and plaster ceiling included.) The cost of this system was $1.33 a square foot. Dead load weight was 68 lbs. a square foot. The columns for this type of floor were 14″ BH-236 lbs. at the ground floor and cost $.412 a square foot, totaling $1.74 a square foot complete.

•

Type III. Tile and joist floor, steel girders and columns. (10 plus 2, 4″ joists at 20″ cts., 10″ tile fillers widened to 8″ at ends by using 12″ tile. Plaster ceiling included.) The cost of this system was $1.39 a square foot. Its dead load weight being 79 lbs. a square foot, the columns thereby were increased in weight. No saving could be effected over *Type* II.

•

Type IV. Flat arch tile floor, steel girders and columns. (14″ flat arch tile, 2″ concrete top. Plaster ceiling included.) The cost of this system was $1.38 a square foot. Its dead load weight being 74 lbs. a square foot, the columns thereby were increased in weight. No saving could be effected over *Type* II.

•

Type V. All steel battledeck floor, steel girders and columns. (5″ I-beams 14.75 lbs. 24 x 3/16″ plates. 2″ tile fireproofing. Plaster ceiling included. Spandrel wall with brick facing, hollow tile backup, T.C. sills and head.) The cost of this system was $1.35 a square foot. Its dead load being reduced to 42½ lbs. a square foot, the columns thereby were reduced in cost to $.289 a square foot, totaling $1.64 a square foot complete.

•

Type VI. All steel battledeck floor, steel girders and columns. (5″ I-beams 12.25 lbs. 24″ x 3/16″ plates. 2″ tile fireproofing. Plaster ceiling included. Spandrel wall of metal filled with mineral wool.) This construction is the same as *Type* V except in the spandrel wall weight. Its cost per square foot for the floors was $1.32 and for the columns was $.254, totaling $1.57 a square foot complete. Saving over *Type* II was $.17 a square foot.

Note: In the above outline no finish flooring was included. As there is such a great variety of finish flooring available, a separate analysis was made, the schedule for which accompanies this article.

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SPACE GAINED

For a 25′ span the floor thickness of battledeck steel floor system is 9″ (including finish floor) as compared with 16½″ (including finish floor) if the flat tile arch construction were used. In the Lake Front Building this means that where twenty stories are now permitted under the present zoning ordinance, twenty-one and one-half stories of the same clear ceiling height can be built within the same volume.

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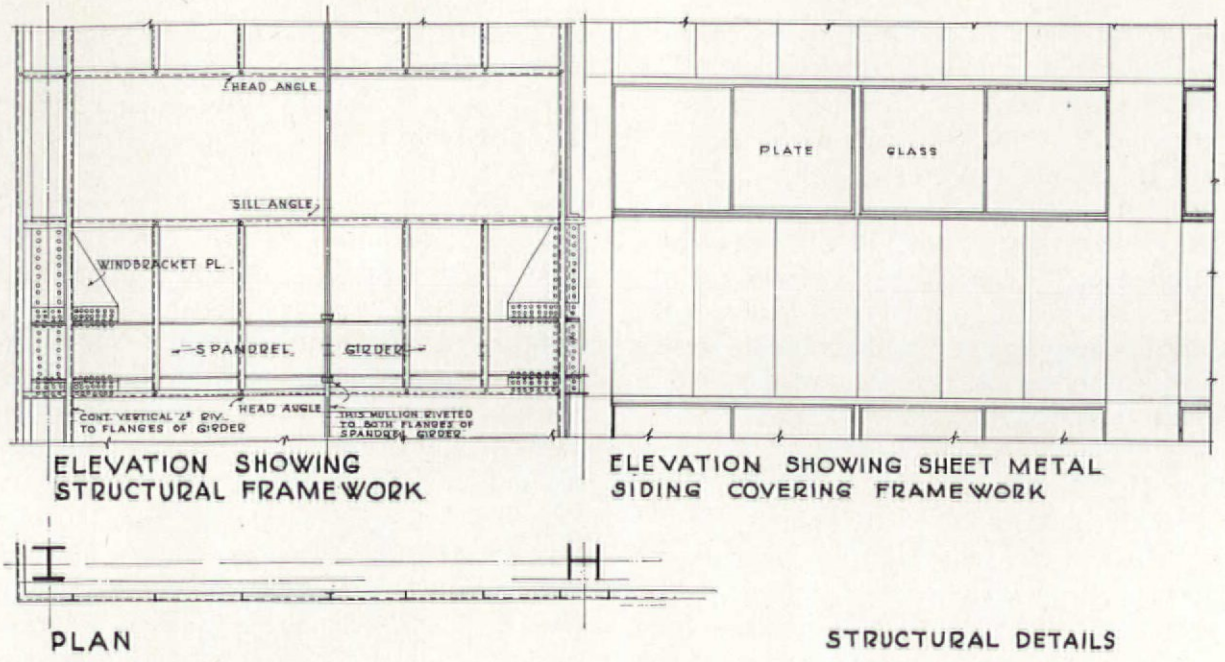
ADVANTAGES OF METAL WALL AND FLOOR CONSTRUCTION

The outstanding advantages of these two methods when combined are the increase in usable volume, decrease in cost and speeding up of erection time. The latter feature, the saving in time required for erection, is of considerable importance in some buildings.

•

CONSTRUCTION TIME SAVING

The metal building is like a large Meccano set, fabricated almost entirely in the steel mills where the work done on it can be accomplished in a much more efficient manner because of the availability of rig-



ELEVATION SHOWING STRUCTURAL FRAMEWORK

ELEVATION SHOWING SHEET METAL SIDING COVERING FRAMEWORK

PLAN

STRUCTURAL DETAILS

ging for punching, riveting, welding and other fabricating operations.

Where the battledeck floor is used, it can be built of plates and I-beams on 2′ centers in such a way that three or four widths of plates may be shop-welded to the I-beam joists which support them and delivered to the job in sections with two-thirds of the welding already done. This would effect a cost saving in the welding and a time saving in the erection.

Where a metal floor system is used consisting of I-beam joists with Holorib, Mahon, Truscon or other steel roof decking inverted and laid on the top of the joists and filled with terrazzo, a still greater saving in cost of material and welding is effected as well as a great saving in erection time.

Time savings in construction are of primary importance because during the entire time that a building is under construction capital must be at hand, ready to be paid out and yet not a cent can be taken in. A building taking a year to build using the old methods of so-called fireproof construction would take from eight to nine months to construct entirely in metal. This means that the money invested is idle for only 65% to 75% of the time that it has been idle heretofore.

SPECIAL FEATURES IN BUILDING

Electric Heating

Since the wall construction is insulated to such a high degree, the loss of heat through the wall is reduced to just one-third of the normal loss. Since the windows are double-glazed, the loss of heat through them is reduced to one-half of the normal loss.

The average heat loss through wall and window is thereby reduced to approximately 41% of the heat loss which exists in popular fireproof construction.

These drastic reductions in heat losses make the use of electric heat possible. Also consider the fact that since so much electricity is consumed by this building in operating radiators, ventilating equipment, elevators, refrigerators, ranges, dish washers, clothes driers, general lighting, etc., the public utilities can furnish power at a reduced rate.

The architects have found a means of heating the apartments in such a way that the air will not be scorched and the moisture evaporated as it is in the average steam heated apartment of today.

Due to mechanical circulation of the air across the heating elements by means of fans, the air in the room is constantly in motion which means that the difference in

temperature from floor line to ceiling line will be only two degrees resulting in a comfort heretofore impossible with any other means of direct radiation.

•

Interiors

All interiors are treated in the most modern manner without being tricky or faddish, "modern" being interpreted as the simplest way to obtain an end.

All rooms in this building are indirectly lighted, giving an even glow of perfectly shadowless light.

•

Kitchens

All kitchens will be equipped with mechanical ventilation, electric ranges, electric refrigerators and electric dish washers. The cabinet work being entirely in metal is vermin proof and cannot warp or shrink.

•

Bathrooms

The bathrooms will have large sunken tubs enclosed in plate glass; special lavatory built entirely of metal; dressing table; mechanical ventilation as well as two large windows; built-in towel cabinets, medicine cabinets, etc.

•

Lobby and Vestibule

The building lobby and vestibule will be wainscoted with marble from floor to ceiling. The floors are of terrazzo and the ceiling silver-leafed. The lighting fixtures are executed very simply in pewter.

•

Elevators

The elevators are of high speed type, the cabs being leather covered; the elevator controls are entirely automatic, but uniformed operators will be always on duty.

•

Radio Facilities

It has been claimed that radio reception in an all-metal building would be impossible. This is not true of this building, owing to the fact that one aerial is installed on the roof and one centralized radio is located in the elevator penthouse. This radio set is so designed that it can be operated by remote control from any apartment in the building in such a way that each tenant may select any station on the dial without interference from any other apartment, even though they are all receiving from different stations.

In each apartment there will be a loud speaker installed in a flush panel with one volume dial and one tuning dial only. The mechanism installed in each apartment is so designed that no amateur mechanic can remove any parts or tamper with any adjustment. Extensions may be made from the loud speaker to any other room in which a loud speaker is desired, similar to telephone extensions.

The fact that the building is constructed of metal walls assists in shielding the radio sets within its walls from interference of outside disturbances.

•

Lightning Safety

Making an object lightning-safe requires its proper "grounding." The walls being constructed of metal and connected to the ground, any electrical charge which might accumulate on its face by induction, as from a passing cloud, will be conducted immediately to the earth.

ROBERT L. DAVISON.

COST SCHEDULE OF FINISHED FLOORING FOR BATTLEDECK CONSTRUCTION

MATERIAL	SIZE	UNDER BED	ADDITIONAL FIRE-PROOFING REQUIRED	OVERALL THICKNESS	TOTAL COST PER SQ. FT.
QUARRY TILE RED	1" THICK 9x9" SQ.	1½" CEM. GROUT	NONE	2½"	85¢
	⅜" THICK 6x6" SQ.	"	"	2⅛"	75¢
QUARRY TILE BROWN	1" THICK 9x9" SQ.	"	"	2½"	95¢
	⅜" THICK 6x6" SQ.	"	"	2⅛"	85¢
ART MARBLE (BOTTICINO)	1" THICK 12"x12" SQ.	"	"	2½"	85¢
TERRAZZO	⅜" MARBLE CHIPS BRASS STRIPS 24"o.c.	¼" "	"	2"	40¢
*MOULSTONE	½" THICK WEARING SURF.		2" CEMENT SLAB SIDEWALK FINISH	2½"	36¢
MASTIC (100% SLATERITE)	⅜" THICK WEARING SURF.		"	2⅛"	42¢
LINOLEUM	¼" BATTLESHIP		"	2¼"	46¢
CORK	⅛" THICK		"	2⅛"	60¢
RUBBER TILE	⅛" THICK		"	2⅛"	71¢
*OAK #1 RED	⅞" THICK 12" PARQUET SQUARES		"	3"	75¢
*OAK #1 RED	⅞" THICK 2½" STRIP FLOORING		2" CEMENT SLAB ROUGH	3½"	66¢
CARPET COMMERCIAL GRADE	ABT. ⅜" THICK	½" OZITE	2" CEMENT SLAB SIDEWALK FINISH	2⅜"	1.10¢

* A FORM OF HARDENED MASTIC

The August issue of THE ARCHITECTURAL RECORD will contain a Technical News study on qualities of various metals for exterior use.

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

LOCATION

Situated at the center of Chicago's financial district on the site of the old Chamber of Commerce Building. It is immediately opposite the City Hall and County Building.

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LAYOUT

The entrance to first floor banking room extends the entire 30-foot width of the lobby, which obtains a direct thoroughfare from La Salle Street to Clark Street through the bank building and the adjoining building. The ceiling height is 14 feet in the clear.



FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

Commercial banking room extends almost the entire length of the building and is 167 feet long, 57 feet wide, and 36 feet high.

The Foreman State National Bank, the Foreman State Trust and Savings Bank, and the Foreman State Corporation Investment Affiliates occupy nine floors of the building, with two separate elevators which serve the bank premises exclusively. Above the banking floors are offices.

On the sixth and seventh floors are located the investment and trust departments. The directors' room, private dining room and kitchen are located on the 38th floor. The usual type of directors' room with its long table and stiff chairs has been replaced by a room where the bank officers may lounge after their luncheon.

Vault chambers occupy the entire basement. There is a capacity of 35,000 boxes, 95 coupon booths, and 11 conference rooms. A spacious ladies' lounging room is provided on this floor for those women who wish to rest or who have made an appointment to meet friends.

•

MATERIALS

Lower six stories faced with Ausable polished granite; Indiana limestone veneer upper 36 stories; walls of lobby and main banking room: Tavernelle Claire marble slabs; floors of lobby and bank: Tennessee marble; office corridors are in Botticino marble with Tennessee marble floors.



OFFICERS' DESKS



Photos: Chicago Architectural Photographing Co.

LOUNGING ROOM

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS



Photo. Chicago Architectural Photographing Co.

OFFICERS' SPACE

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

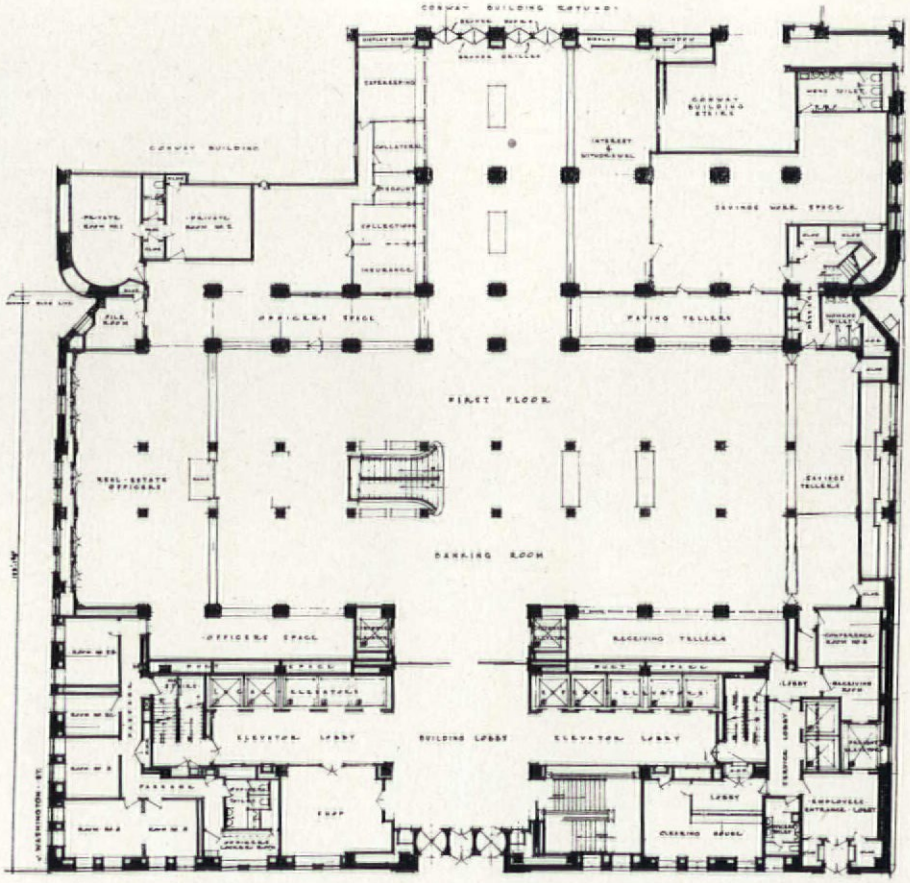


Photo. Chicago Architectural Photographing Co.

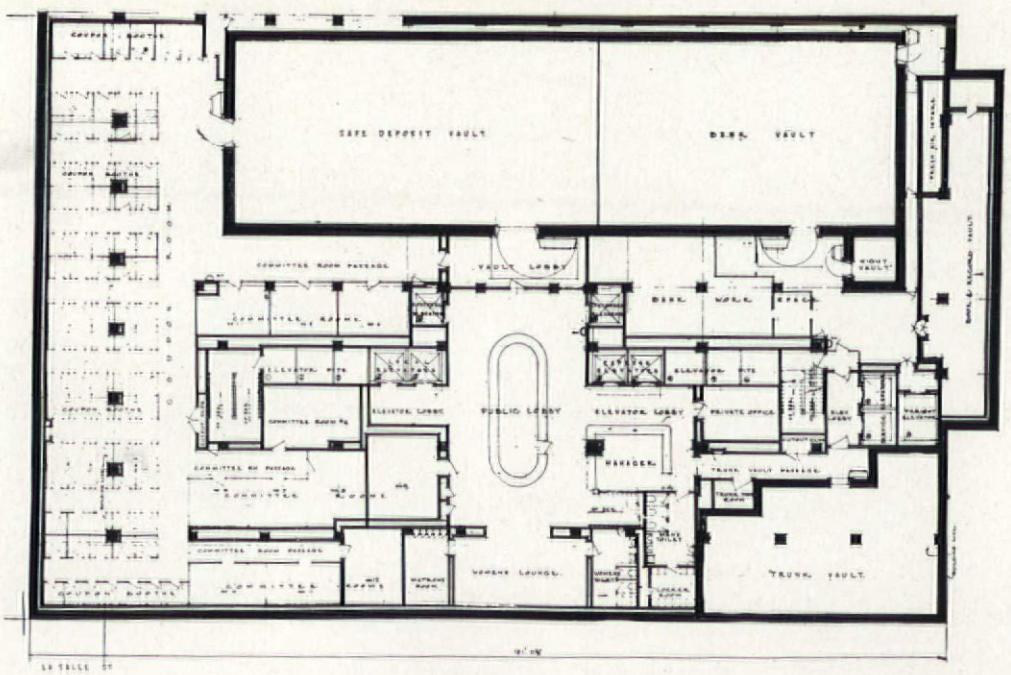
COMMERCIAL BANK ROOM

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS



GROUND FLOOR PLAN



BASEMENT PLAN

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

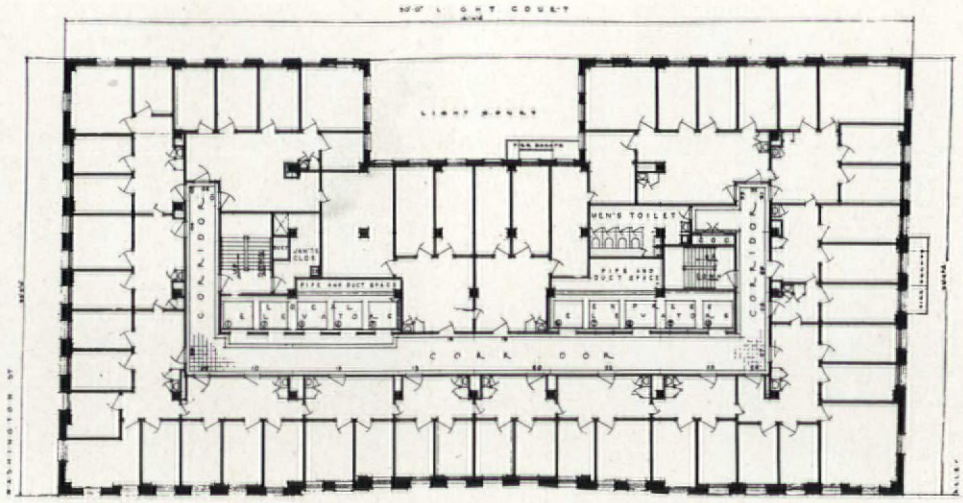


Photo. Chicago Architectural Photographing Co.

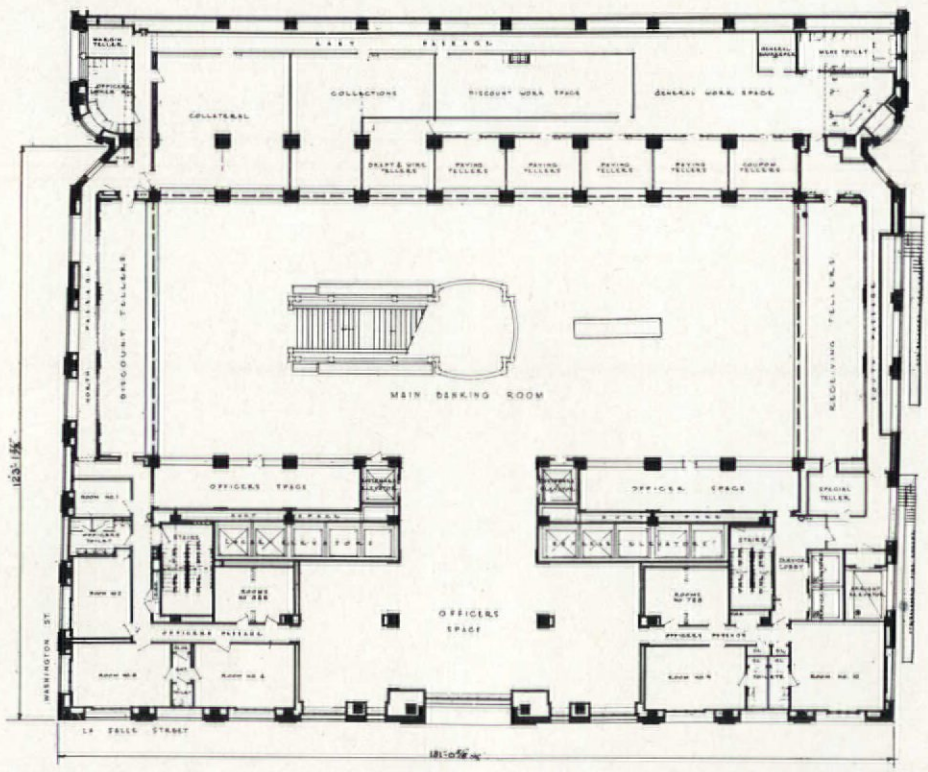
ENTRANCE STAIRS LEADING TO BANKING ROOM

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS



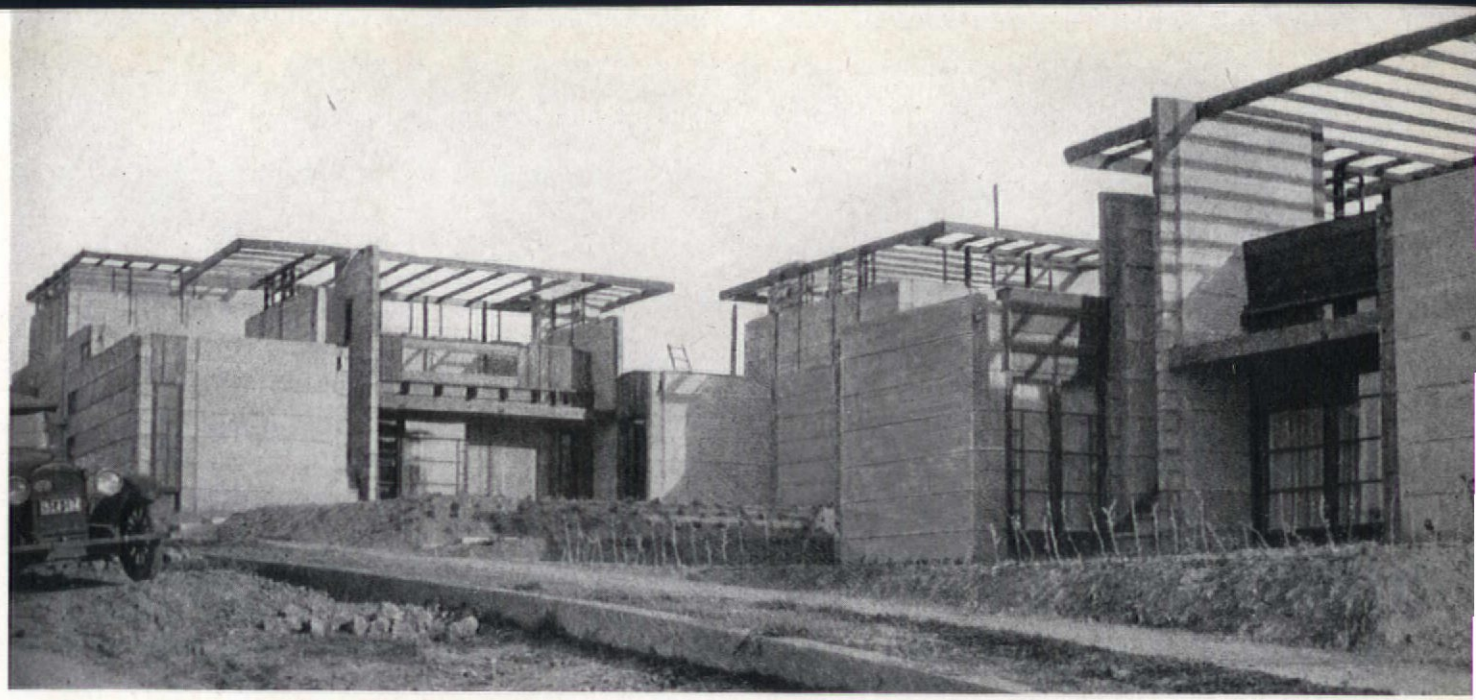
TYPICAL FLOOR PLAN



SECOND FLOOR PLAN

FOREMAN STATE NATIONAL BANK BUILDING, CHICAGO

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS



HOUSES FOR OUTDOOR LIFE

A Vacation Settlement on the Pueblo Ribera, La Jolla, California

R. M. SCHINDLER, ARCHITECT

THE LOCATION

A sloping piece of ground close to the shores of the Pacific Ocean, on the southern end of La Jolla, facing two parallel streets and bisected by a public alley.

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THE PROGRAM

Dr. W. L. Lloyd decided to build a group of twelve houses including garages for rental to summer vacationists. The utmost economy was necessary to meet the competition of the customary primitive wooden beach shack.

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THE LAYOUT

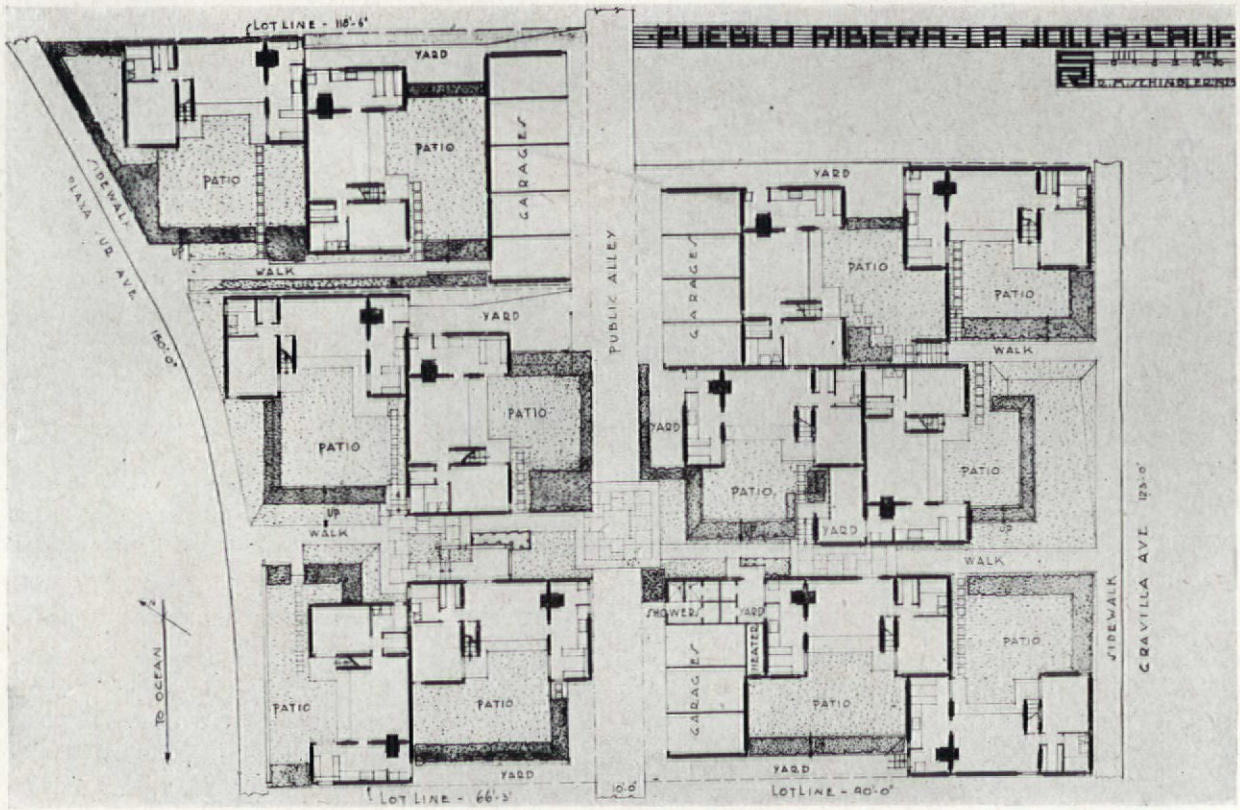
In order to facilitate extensive outdoor life a play court for each house was considered necessary. The single house unit is repeated twelve times. The units are arranged to give complete privacy to the play courts in front of the living rooms. In no case do a neighbor's windows open into a court. Each house has a roof terrace surrounded by a parapet of sufficient height to assure privacy. Each roof terrace is equipped with a fireplace and looks freely out toward the ocean. The garages are accessible from the public alley. A central gas heater and circulating system provide hot water for all dwellings. A group of public showers serve the bathers returning from the beach.

The court side of each living room is formed by sliding glass doors which may be opened full length. High windows on the other side of the room open out above the lower side portions of the house. Their location right below the ceiling insures ample light and ventilation and serves to counteract the effects of the sun on the roof terrace. Each living room has a real fireplace; a couch and a closet permit its use as a guest room. Each kitchen is equipped with an icebox and a garbage incinerator.

•

STRUCTURAL SCHEME

All floors are made of concrete and laid right on the ground. The roofs are constructed of wood joists covered with shiplap and composition roofing. The roof terrace is formed by a concrete slab laid on top of the roofing. All walls are made of concrete by a "slab-cast" scheme. It is a



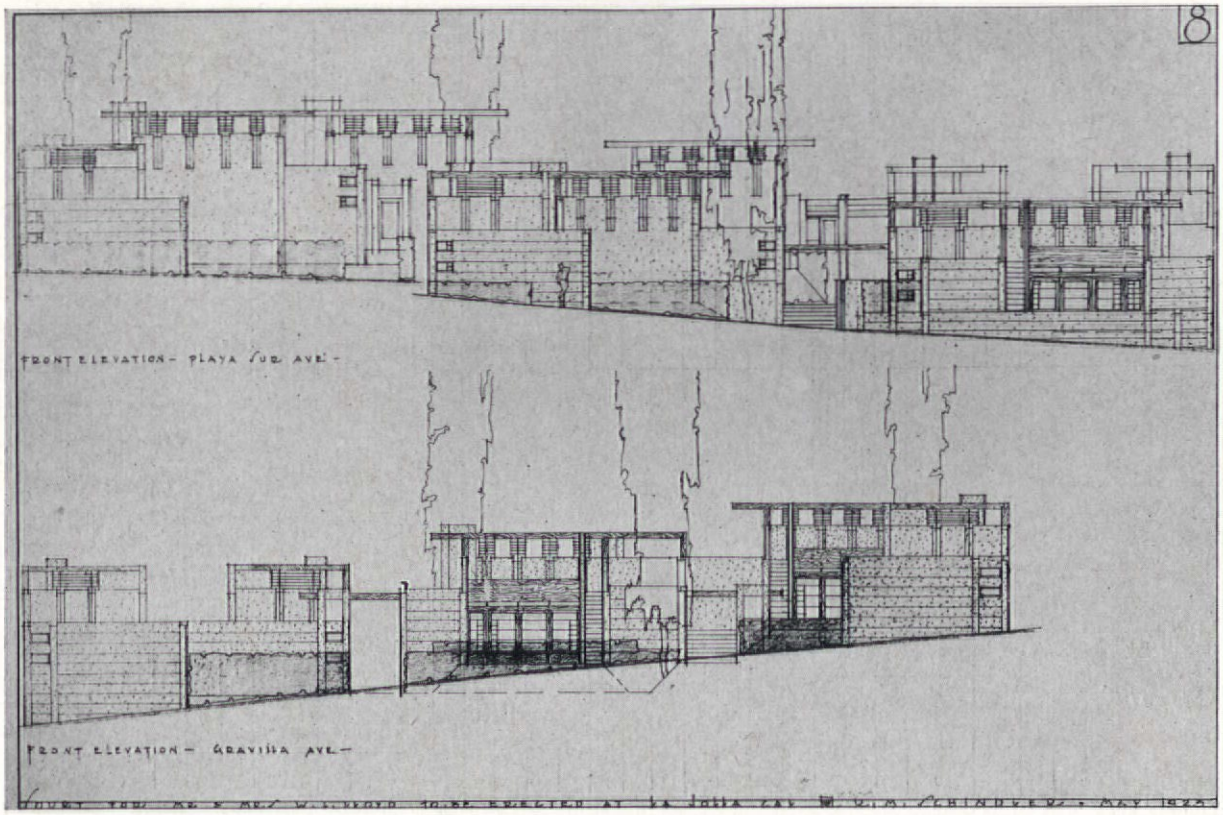
PLOT PLAN OF DEVELOPMENT
PUEBLO RIBERA, LA JOLLA, CALIFORNIA
R. M. SCHINDLER, ARCHITECT

type of monolithic concrete wall construction suitable for one- and two-story buildings. In climates colder than California some added provision for heat insulation should be made.

The "slab-cast" form work is made of wood and consists of a skeleton of vertical guides and a single continuous course of horizontal wall forms. The guides are two inches thick and have bevelled edges to help the stripping. The wall forms slide on the outside of the guides. They are made of two-inch boards held together by cleats. The inside is covered with roofing paper in order to insure a good surface for the concrete. A small triangular wood strip holds the paper in place and gives a clean cut seam for each course of concrete. The forms are pressed against the guides by means of the cleats and iron clamps.

The concrete floor is placed and finished first. The guides are then erected. Next the window and door frames, anchors, reinforcing rods including special ties at corners, plumbing pipes, etc., are placed between the forms. No cutting of formwork is necessary. One course of concrete is poured each day. The concrete is poured during the afternoon, allowing it to set overnight sufficiently to permit the raising of the forms the next morning. The forms are loosened by opening the clamps and then they are slid up to the next course. Long heavy form units are handled by means of block and tackle fastened to the cross braces on top of the guides.

The concrete used need be only of low strength (500 lbs.). Often suitable aggregate for such concrete is found right on the premises. The form lumber, being two inches thick, is not damaged and so is available for structural purposes. Two sets of forms only were used for the Pueblo Ribera. After forms are once made, unskilled labor



WORKING DRAWINGS
PUEBLO RIBERA, LA JOLLA, CALIFORNIA
R. M. SCHINDLER, ARCHITECT

is sufficient for the handling. No plastering of walls is required either inside or outside.

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ARCHITECTURAL DESIGN

An attempt was made to achieve an organic whole out of the aggregation of small units. The grouping serves to overcome the appearance of a mechanical repetition of units so frequent in similar schemes. Each house receives an individual character through its position in relation to its neighbor and through variations in the design of the woodwork above the openings and in the roof pergola. The neighbor's windowless back walls become attractive garden features. Roof terrace, play court and living room join to form one living space. A uniform scale is maintained throughout by using a scheme of equally spaced unit lines for the whole layout.

Each house is apparently formed by a series of upright slab units. The slab units used to form the enclosure are made of concrete, and those used to screen the openings are composed of wood and glass. All these slab units are joined by recessed links, which result from the use of the form guides. The small horizontal grooves between the courses of the wall do not appear on the links and do not contradict the monolithic character of the slab unit. Architecturally the recessed links are as characteristic of the modern slab wall as the plaster was of the traditional plastic masonry wall.

•

MATERIALS

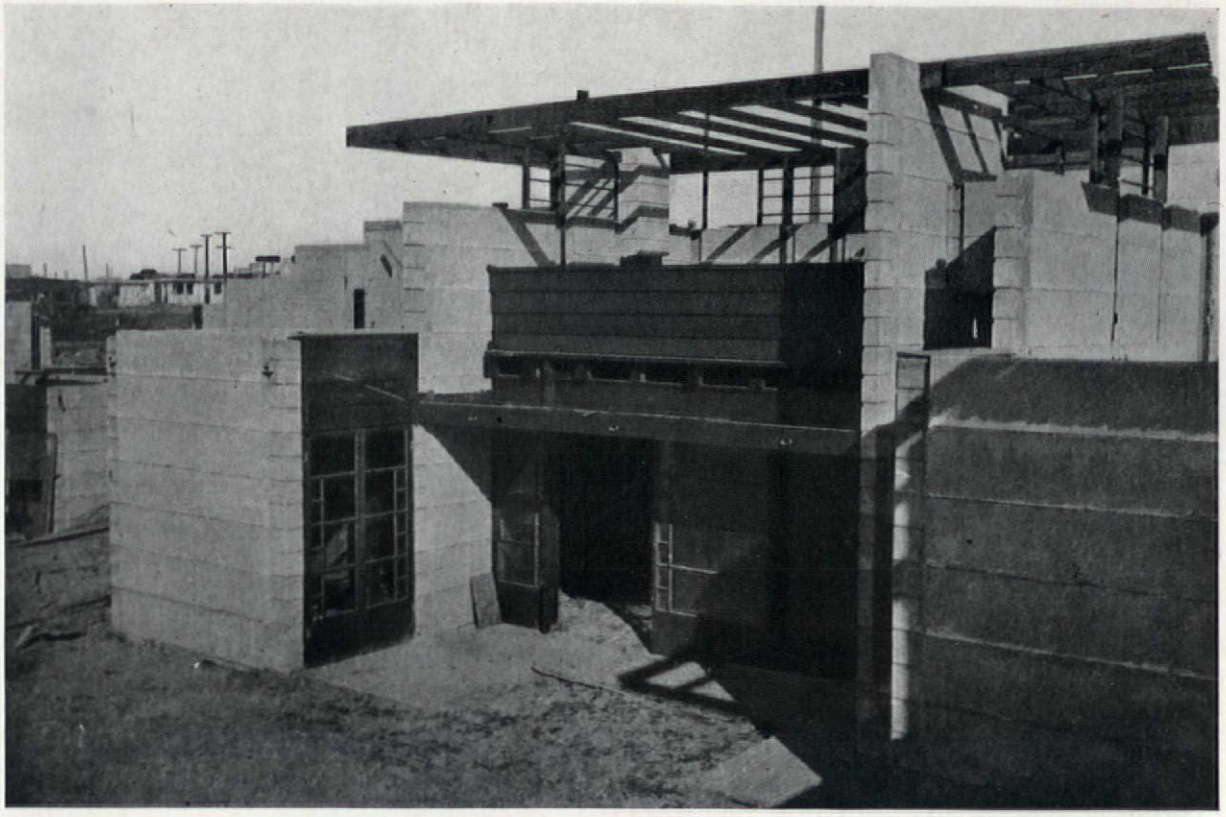
Concrete for all floors and walls.

California Redwood for all exposed wood including furniture.

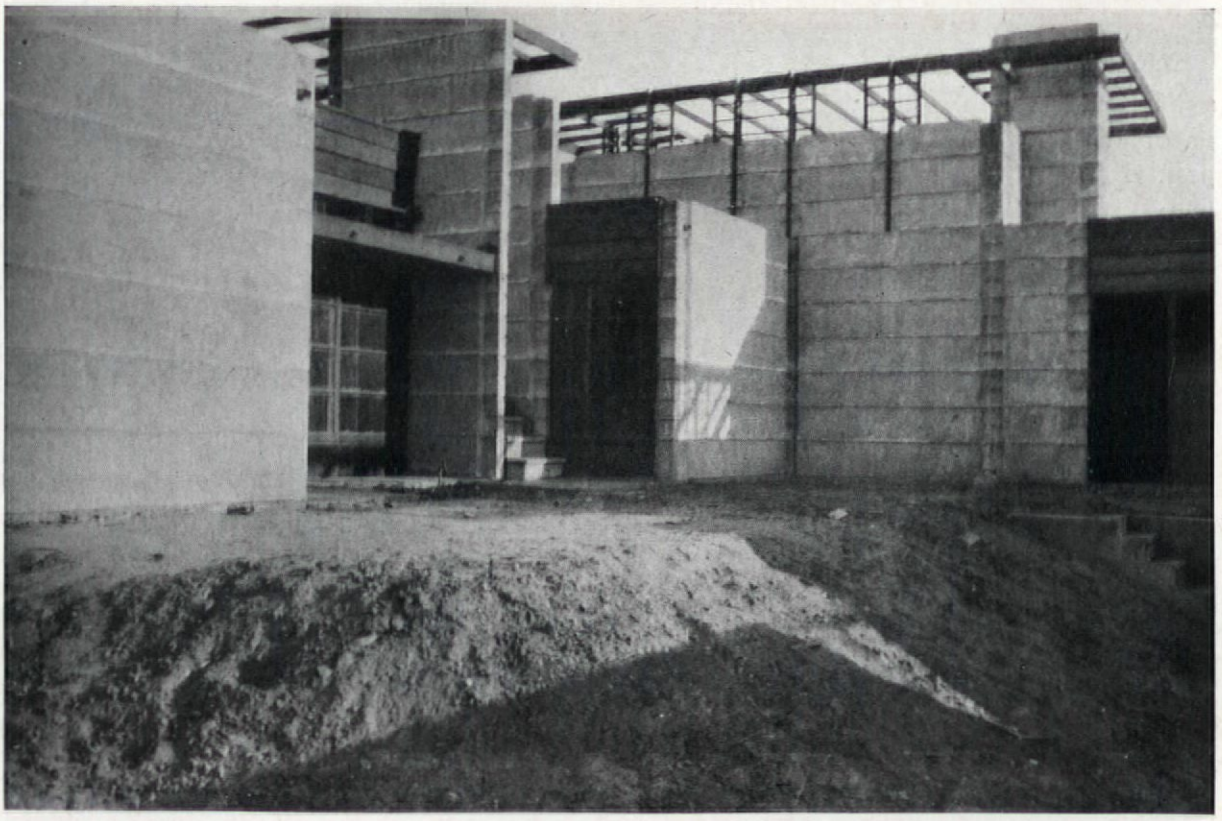
Celotex for the ceiling panels between rafters of living room.

Composition roofing.

Glass.



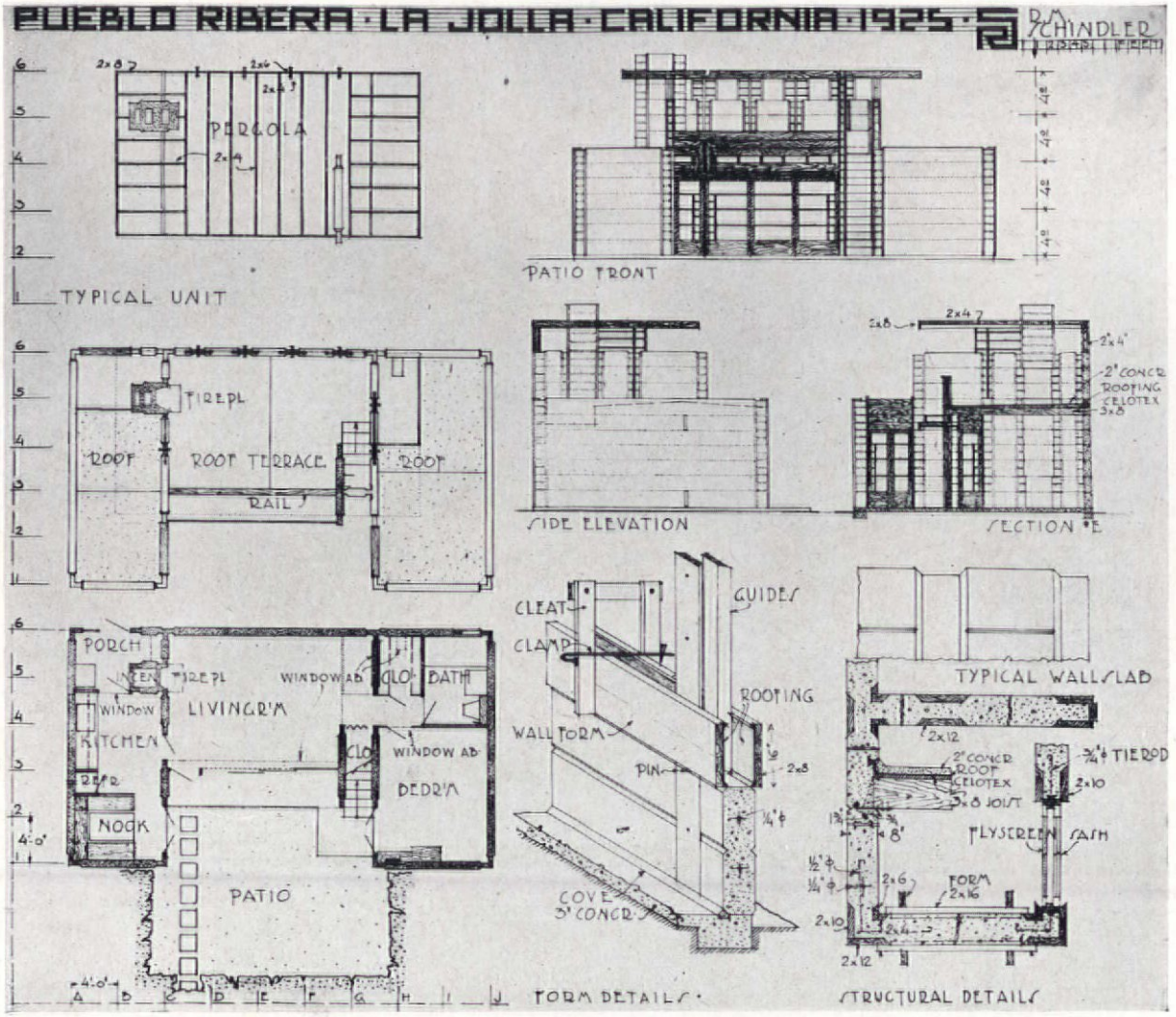
VIEW OF FRONT ELEVATION



A TYPICAL UNIT

PUEBLO RIBERA, LA JOLLA, CALIFORNIA

R. M. SCHINDLER, ARCHITECT



CONSTRUCTION DETAILS

PUEBLO RIBERA, LA JOLLA, CALIFORNIA

R. M. SCHINDLER, ARCHITECT

TEXTURES

Cast concrete, medium rough. Surfaced wood. Glass.

•

COLOR

Concrete Stain (acid): tan to terra cotta.

Waxed Natural California Redwood: brown red.

Natural Celotex: tan.

•

LANDSCAPING

The planting scheme carries the layout of the house into the open. Lawn courts surrounded by salt bush hedges. Torrey pines at entrances. Climbing vines for walls and pergolas.

•

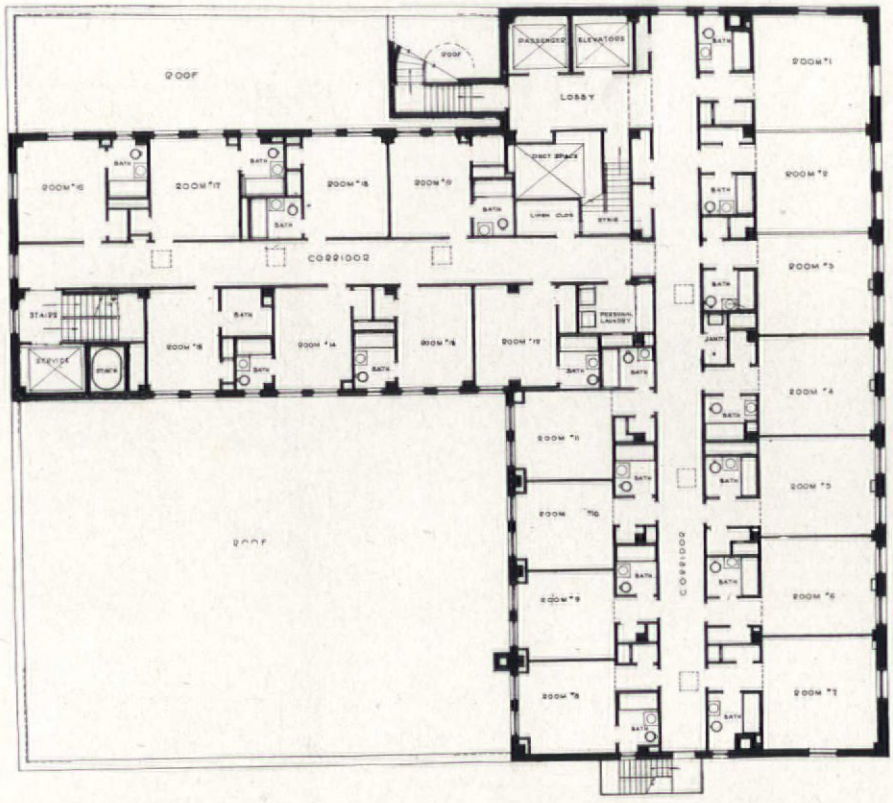
INTERIOR VIEWS OF THE WOMEN'S CLUB OF CHICAGO

HOLABIRD AND ROOT, ARCHITECTS

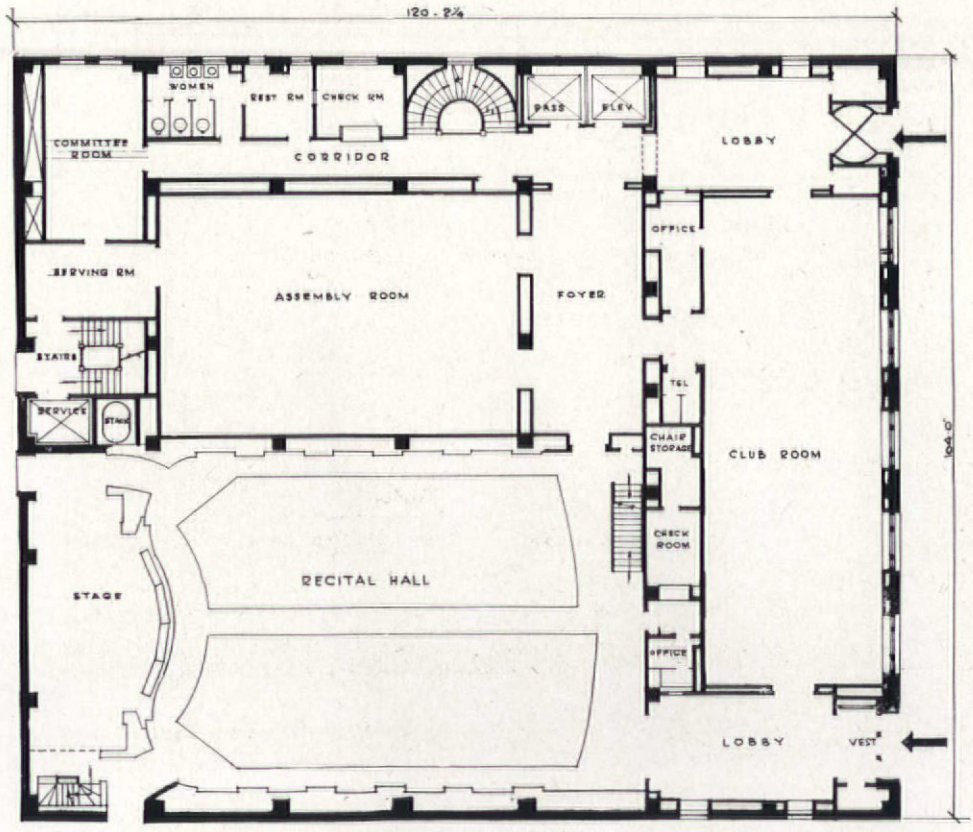


WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS

Club Lounge, with Gold Damask Hangings and Block-Patterned Carpet in Wood Tones



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN
CHICAGO WOMEN'S CLUB

HOLABIRD & ROOT
ARCHITECTS



WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS

Stairway Between Second and Third Floors, Finished in Silver



Corner of Breakfast or Small Private Dining Room, with Sun Yellow Walls and Pistachio Green Taffeta Draperies

WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS



WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS

Directors' Room, with Violet Satin Draperies and Carpeting, and Accents of Green in Wall Paper and Chair Upholstery



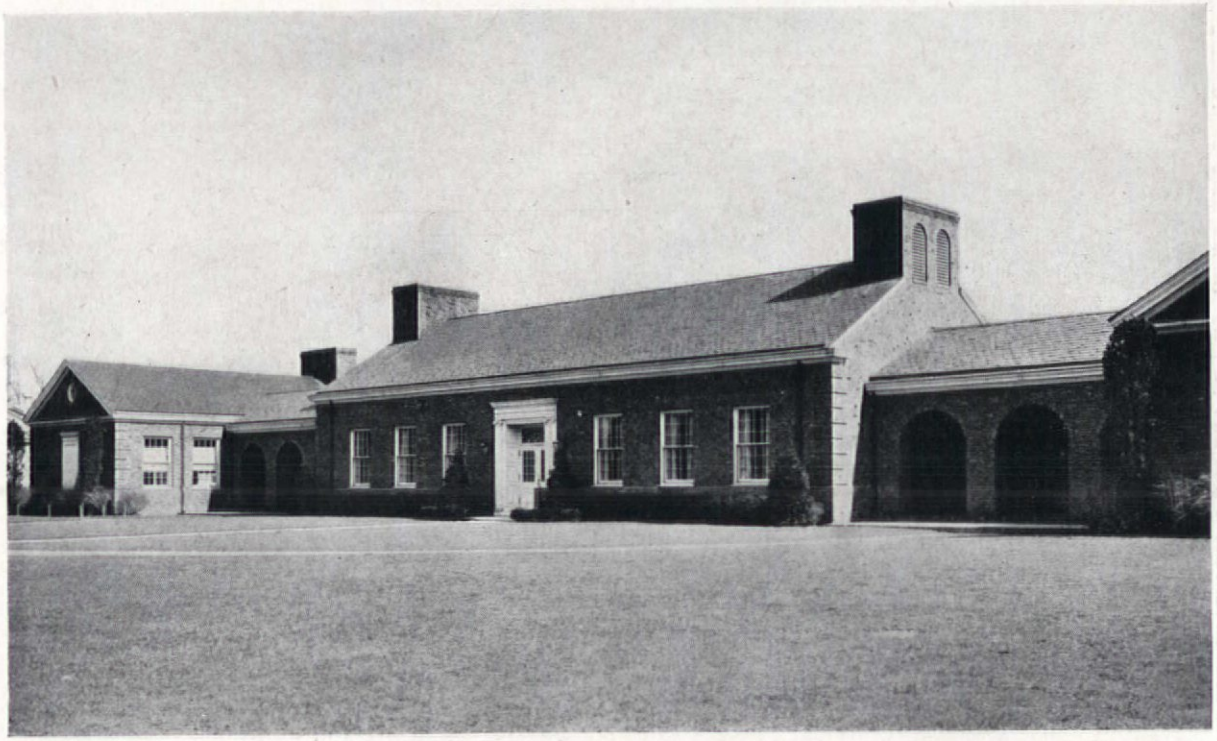
Corridor Adjoining First Floor Lobby

WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS



WOMEN'S CLUB OF CHICAGO
HOLABIRD AND ROOT, ARCHITECTS

PORTFOLIO OF CURRENT ARCHITECTURE



FULTON STREET SCHOOL, HEMPSTEAD, N. Y.
ERNEST SIBLEY, ARCHITECT

FEATURING SCHOOL BUILDINGS



Photo. R. S. Grant

FULTON STREET SCHOOL, HEMPSTEAD, N. Y.

ERNEST SIBLEY, ARCHITECT

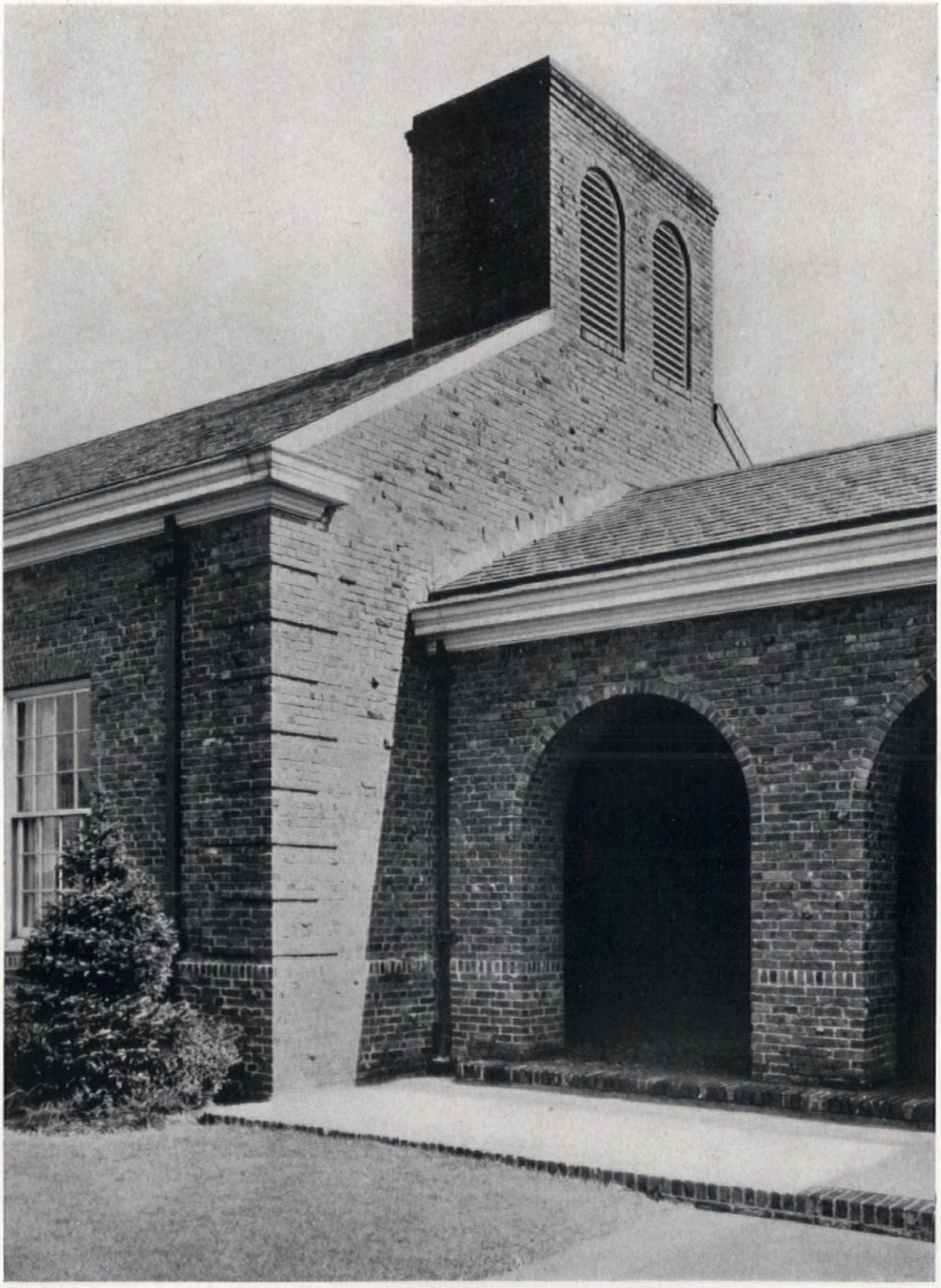


Photo. R. S. Grant

FULTON STREET SCHOOL, HEMPSTEAD, N. Y.

ERNEST SIBLEY, ARCHITECT



Photo. R. S. Grant

FRANKLIN STREET SCHOOL, HEMPSTEAD, N. Y.

ERNEST SIBLEY, ARCHITECT

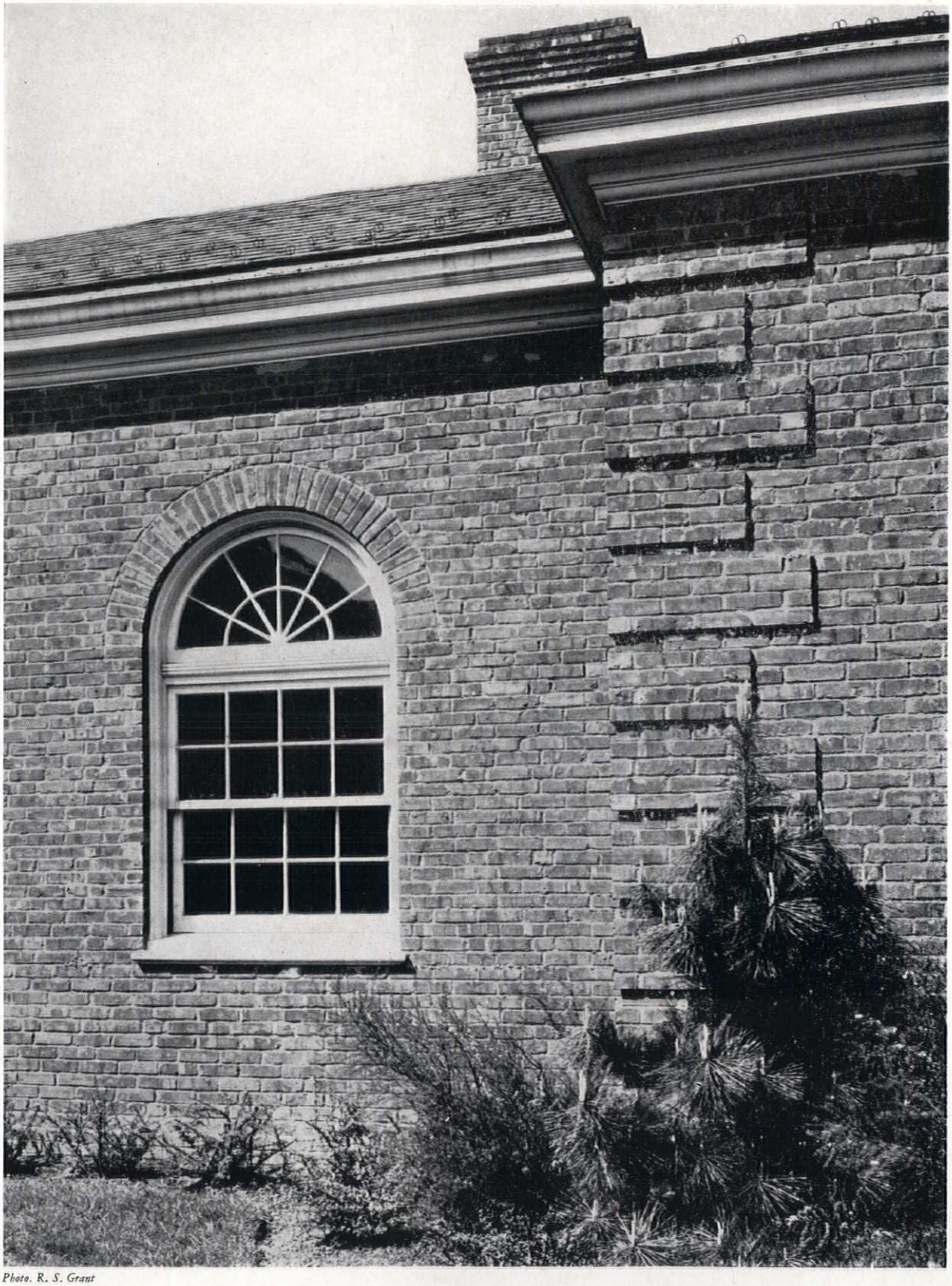
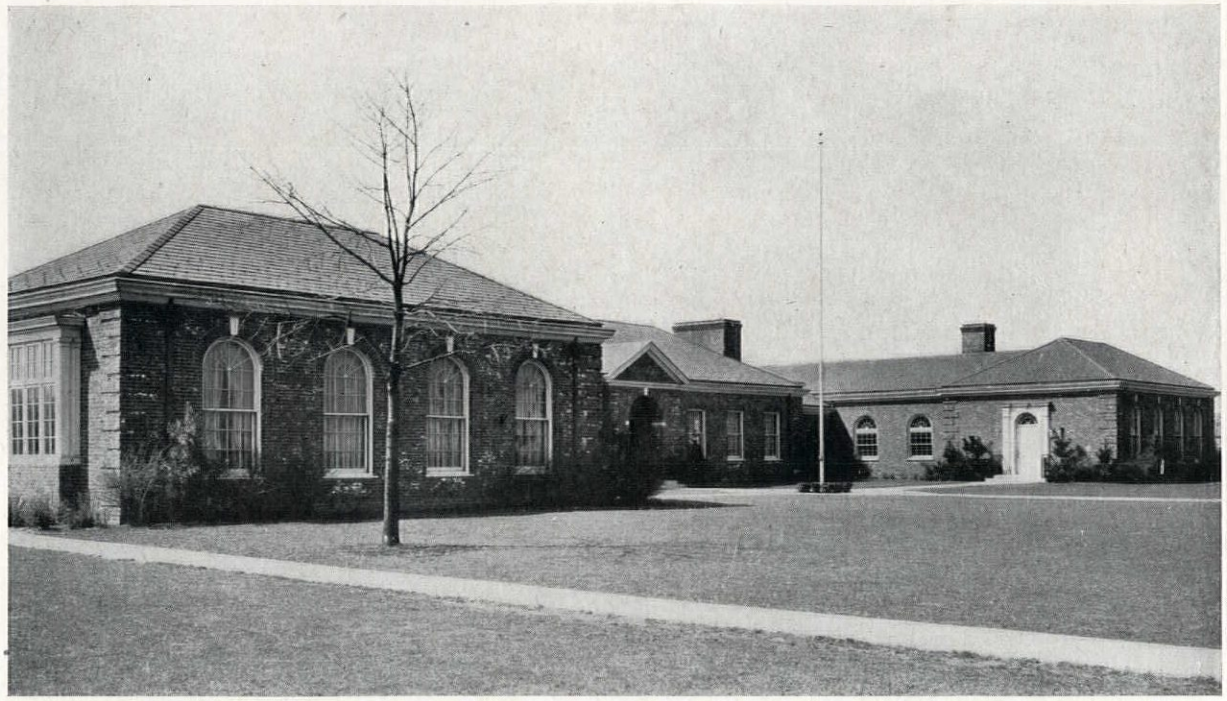


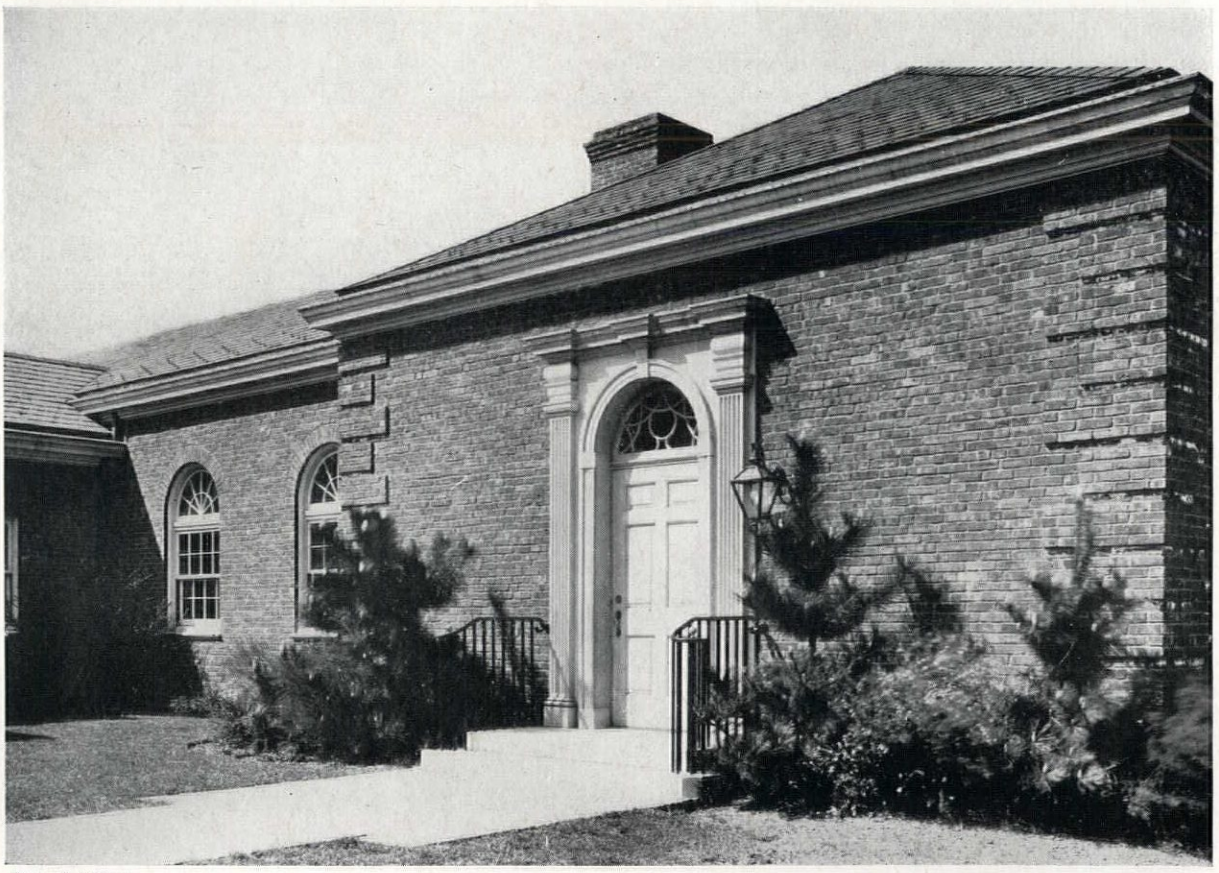
Photo. R. S. Grant

FRANKLIN STREET SCHOOL, HEMPSTEAD, N. Y.

ERNEST SIBLEY, ARCHITECT



GENERAL VIEW

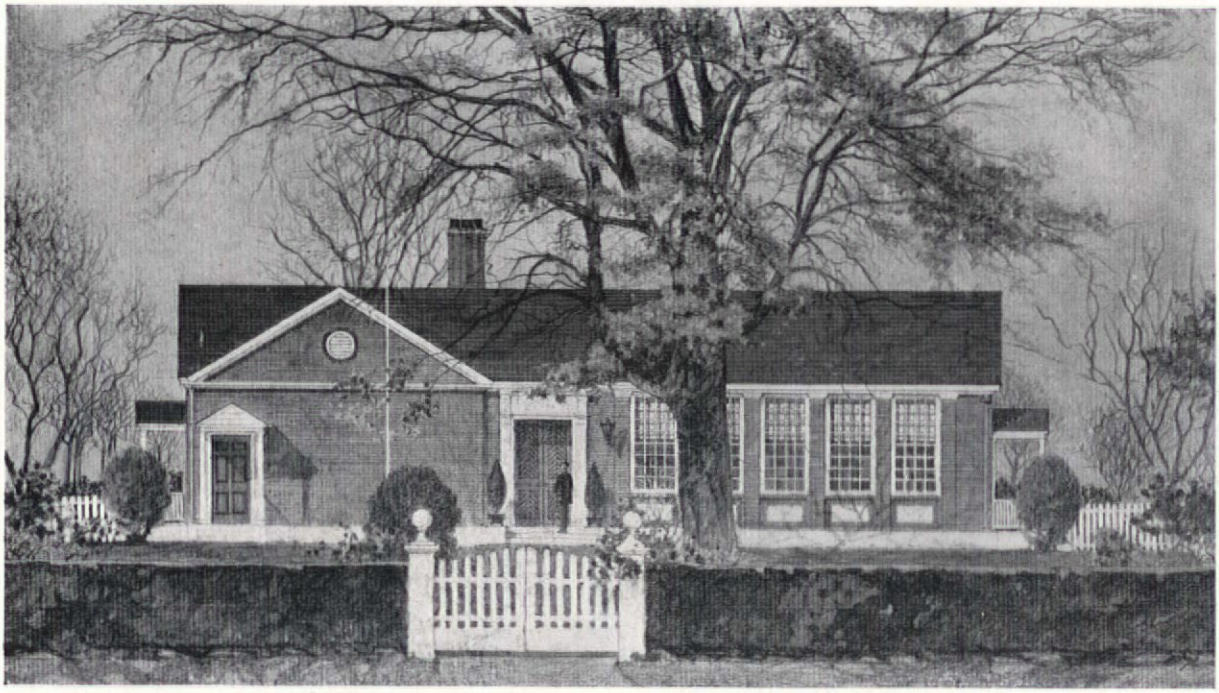


Photos. R. S. Grant

ENTRANCE DETAIL

FRANKLIN STREET SCHOOL, HEMPSTEAD, N. Y.

ERNEST SIBLEY, ARCHITECT



DESIGN OF A SMALL RURAL SCHOOL HOUSE

RALPH HARRINGTON DOANE, ARCHITECT

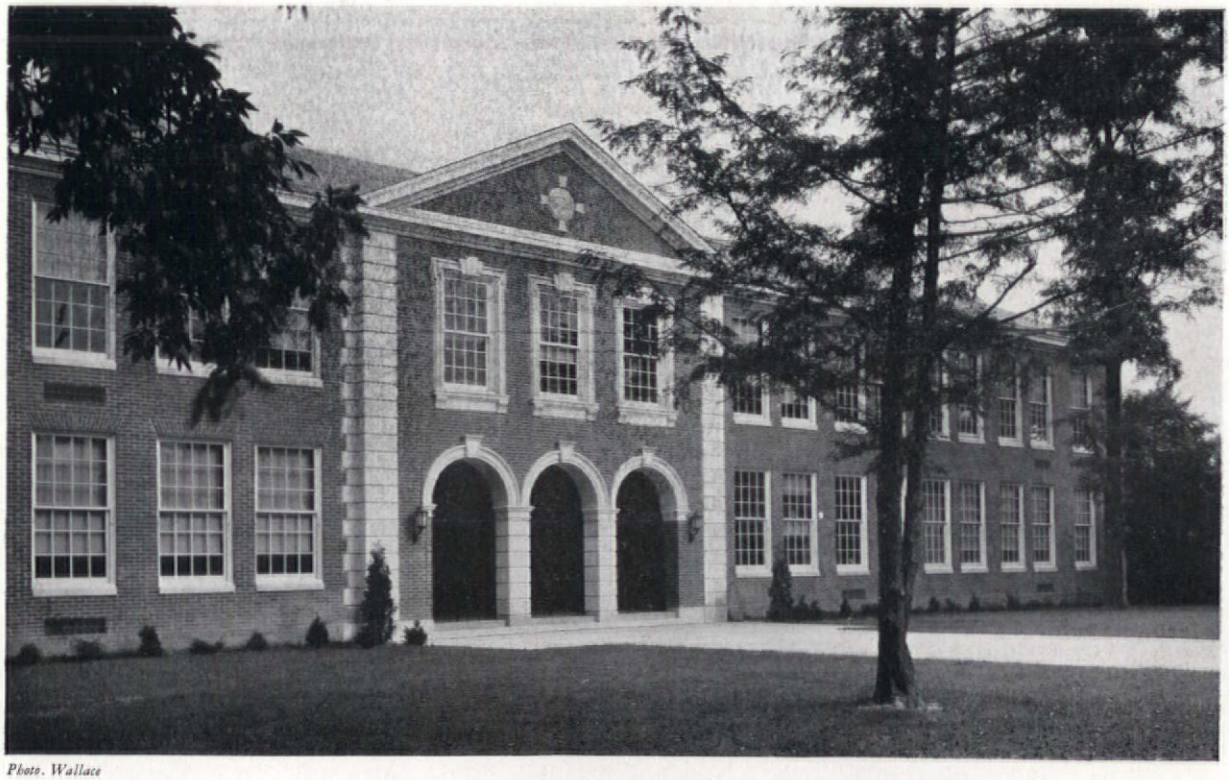
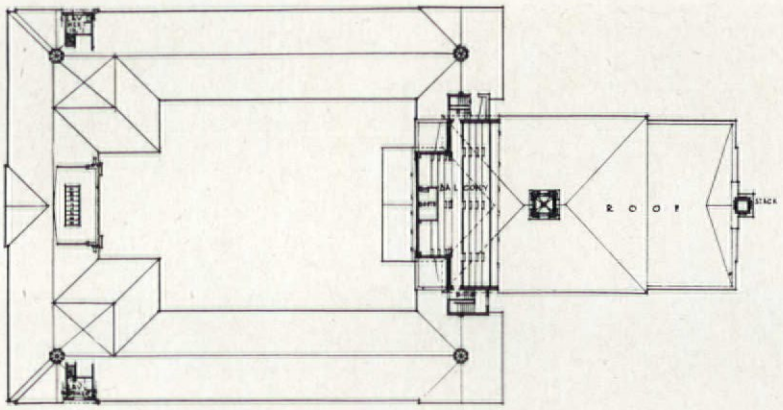


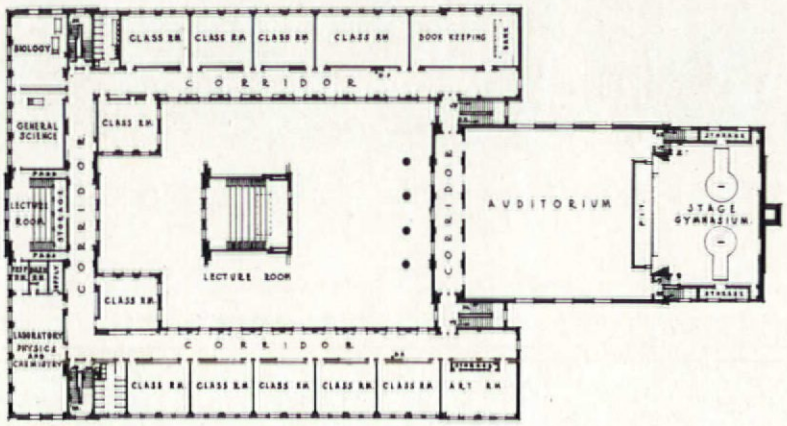
Photo. Wallace

MEMORIAL HIGH SCHOOL, HADDONFIELD, N. J.

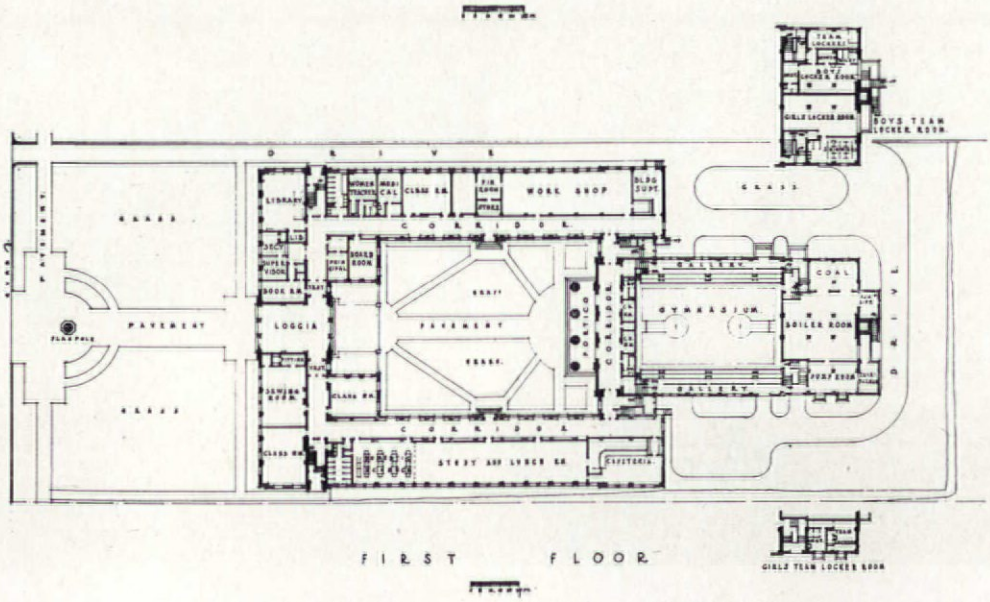
SIMON AND SIMON, ARCHITECTS



BALCONY AND ROOF PLAN



SECOND FLOOR



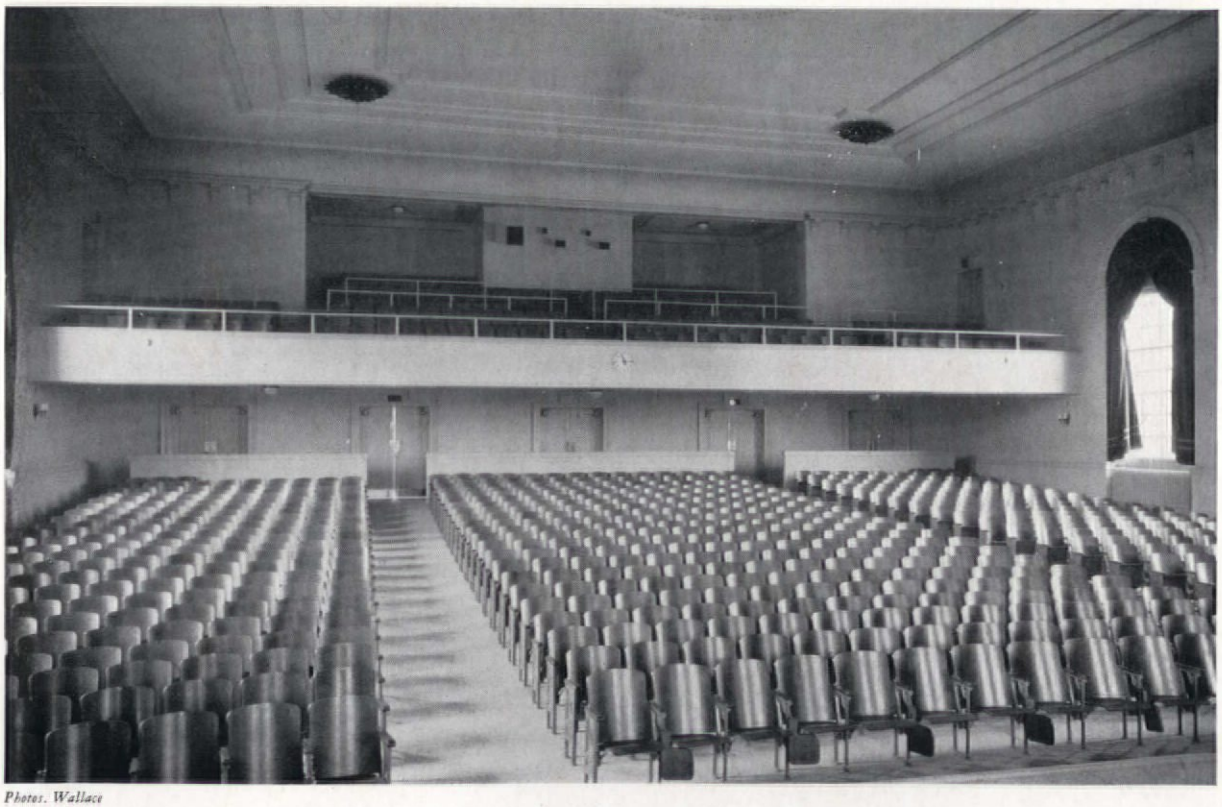
FIRST FLOOR

MEMORIAL HIGH SCHOOL, HADDONFIELD, N. J.

SIMON AND SIMON, ARCHITECTS



CORRIDOR LIGHTED FROM COURTYARD



Photos. Wallace

MEMORIAL HIGH SCHOOL, HADDONFIELD, N. J.

SIMON AND SIMON, ARCHITECTS



Photo, Wallace

VIEW OF ENTRANCE GATEWAY FROM COURTYARD

MEMORIAL HIGH SCHOOL, HADDONFIELD, N. J.

SIMON AND SIMON, ARCHITECTS



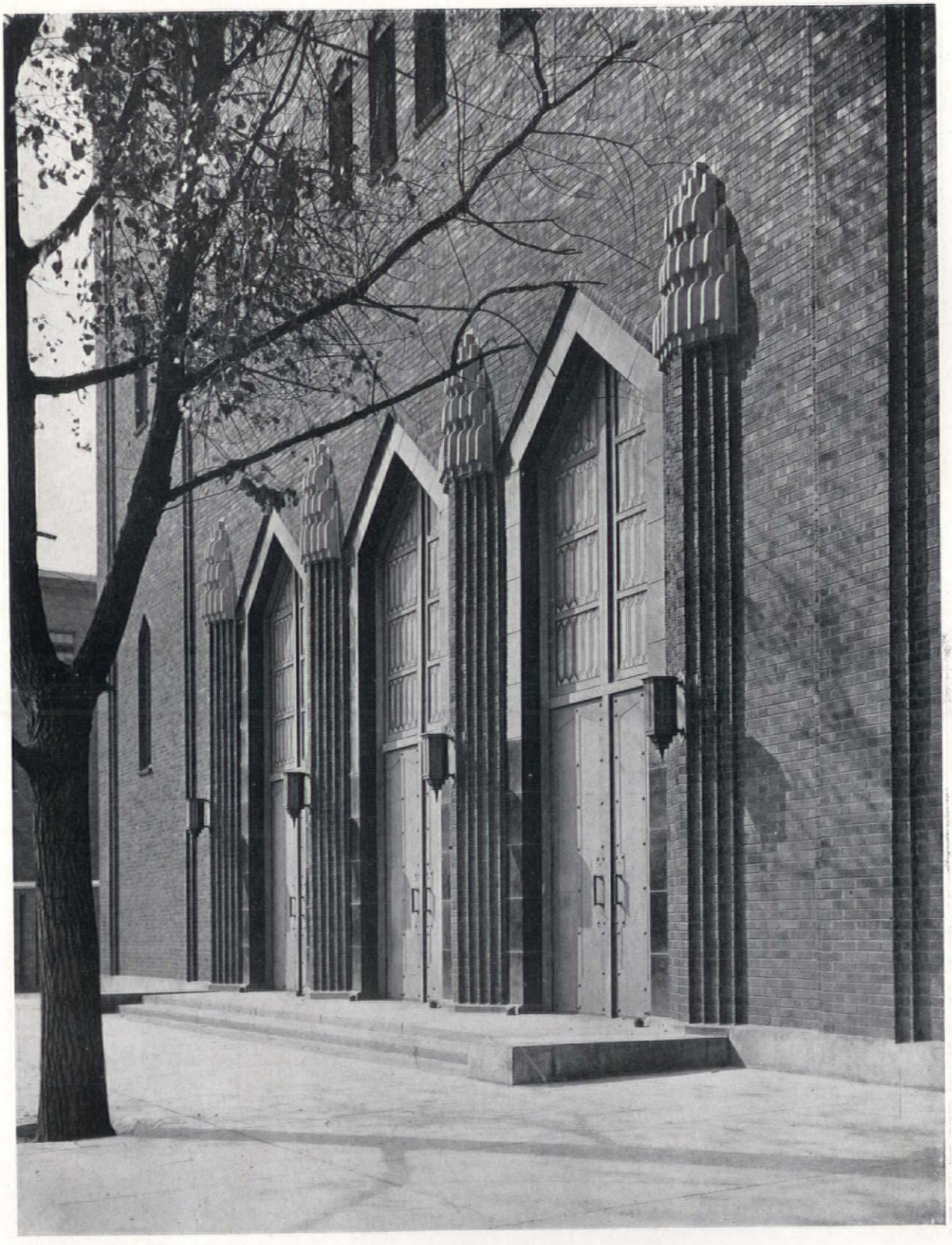
ENTRANCE DOOR WITH ORNAMENTAL WORK IN CAST STONE
SCHOOL OF ST. FRANCIS XAVIER, WILMETTE, ILL.
ALFONSO IANNELLI, SCULPTOR



IMMACULATA HIGH SCHOOL, CHICAGO

BARRY BYRNE, ARCHITECT

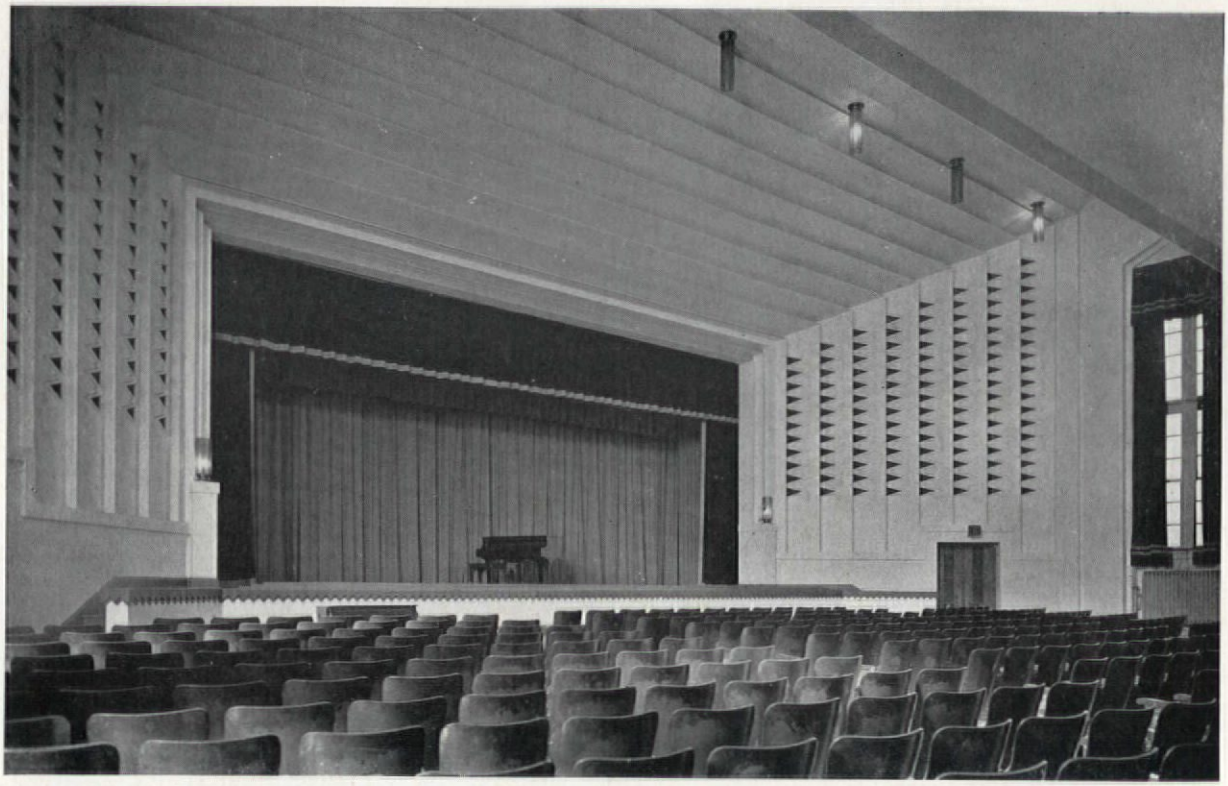
ALFONSO IANNELLI, COLLABORATING SCULPTOR



ST. MARY'S HIGH SCHOOL, CHICAGO

BARRY BYRNE, ARCHITECT

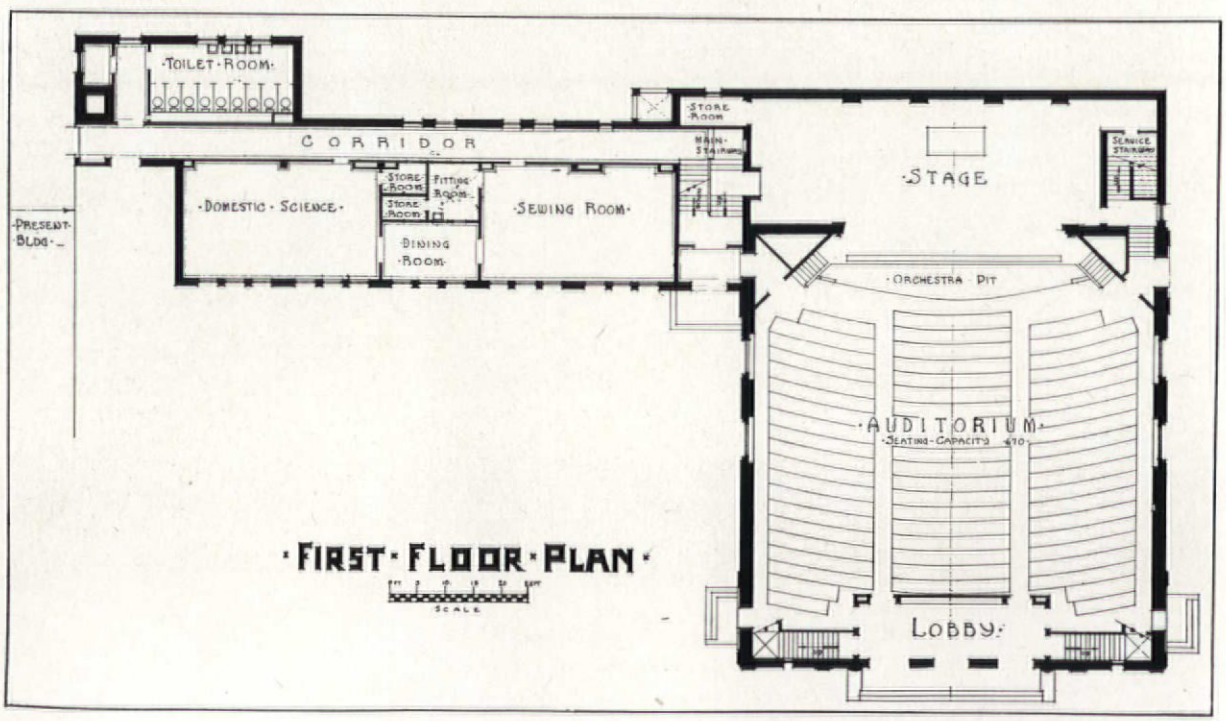
ALFONSO IANNELLI, COLLABORATING SCULPTOR

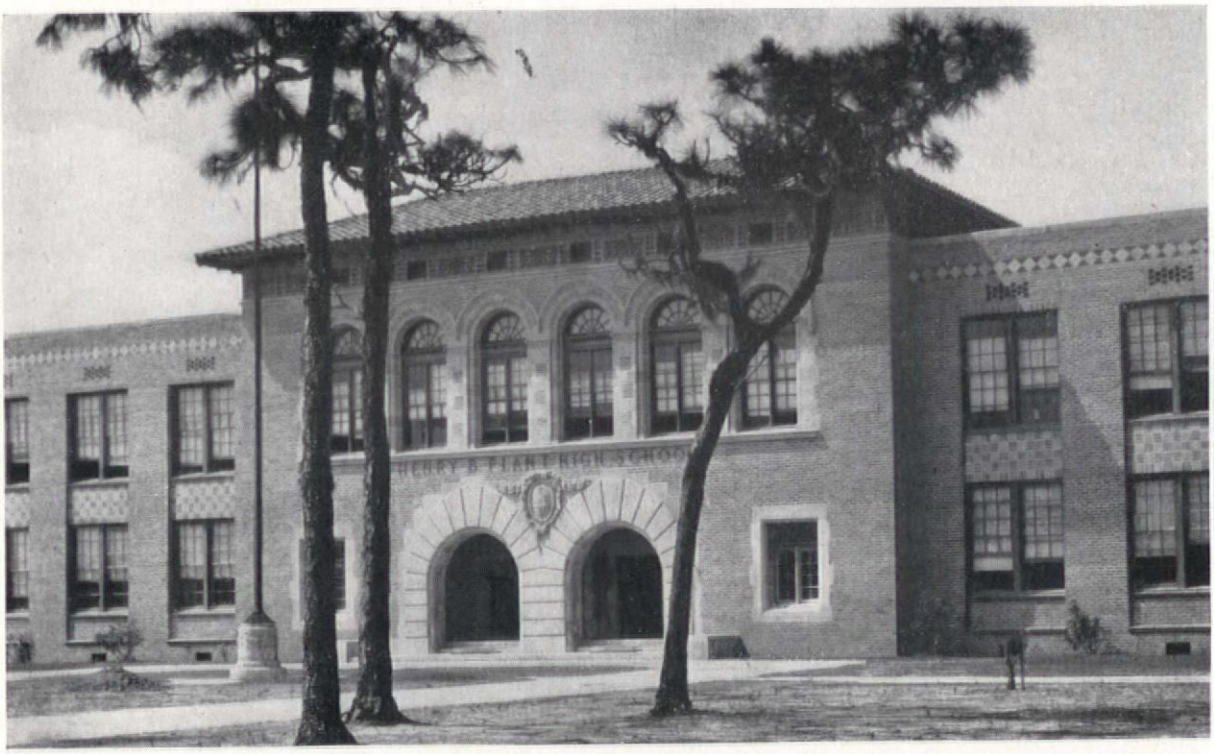


AUDITORIUM

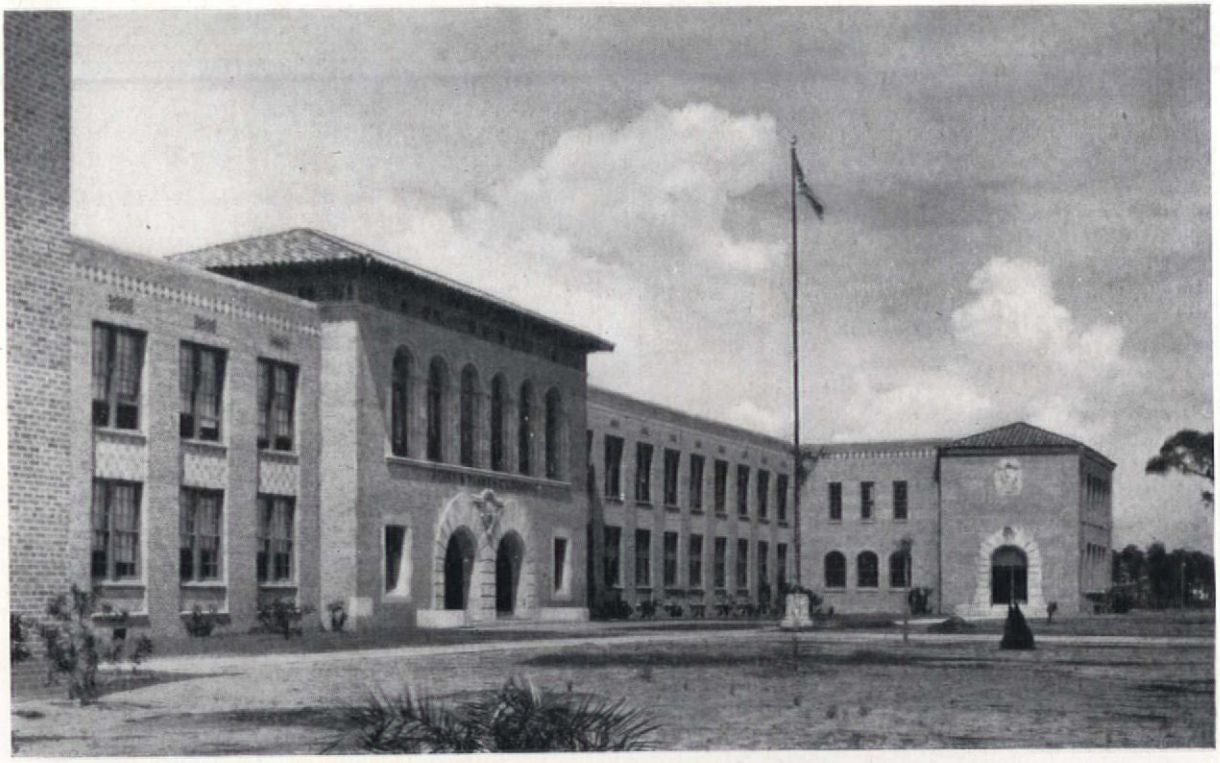
ST. MARY'S HIGH SCHOOL, CHICAGO

BARRY BYRNE, ARCHITECT





ENTRANCE



HENRY B. PLANT HIGH SCHOOL, TAMPA, FLORIDA

FRANKLIN O. ADAMS, ARCHITECT

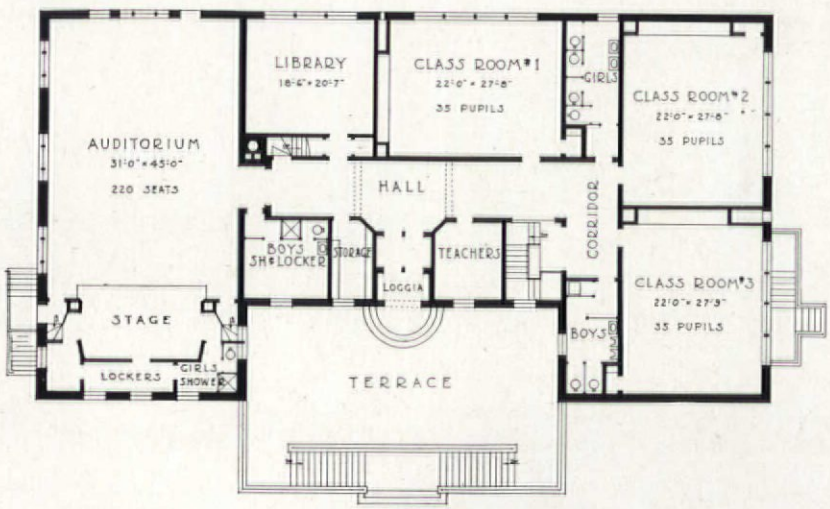
JEFFERSON M. HAMILTON, ASSOCIATE ARCHITECT



Photo, Gottscho

UNION FREE SCHOOL, COLD SPRING HARBOR, N. Y.

PEABODY, WILSON AND BROWN, ARCHITECTS



GROUND FLOOR PLAN

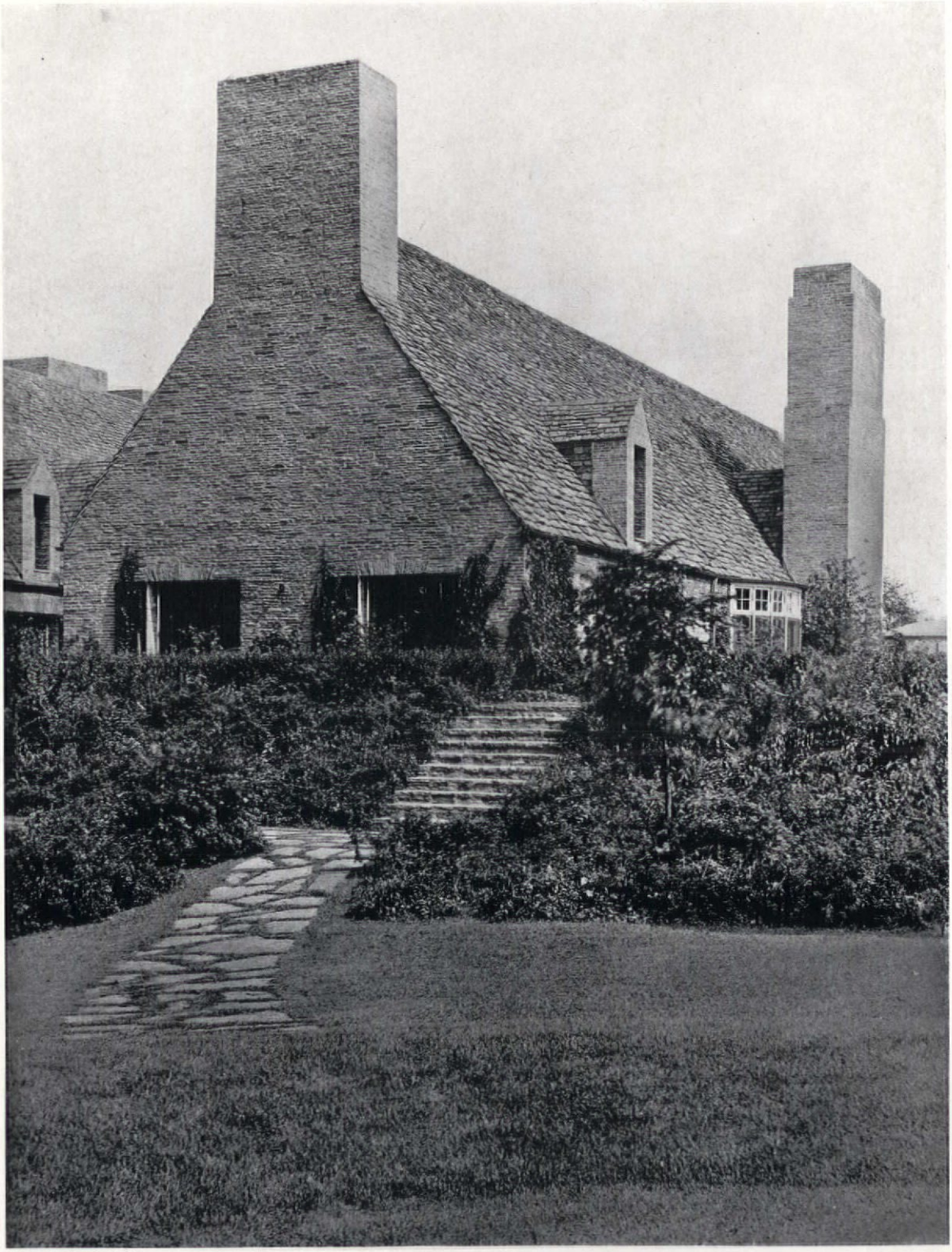
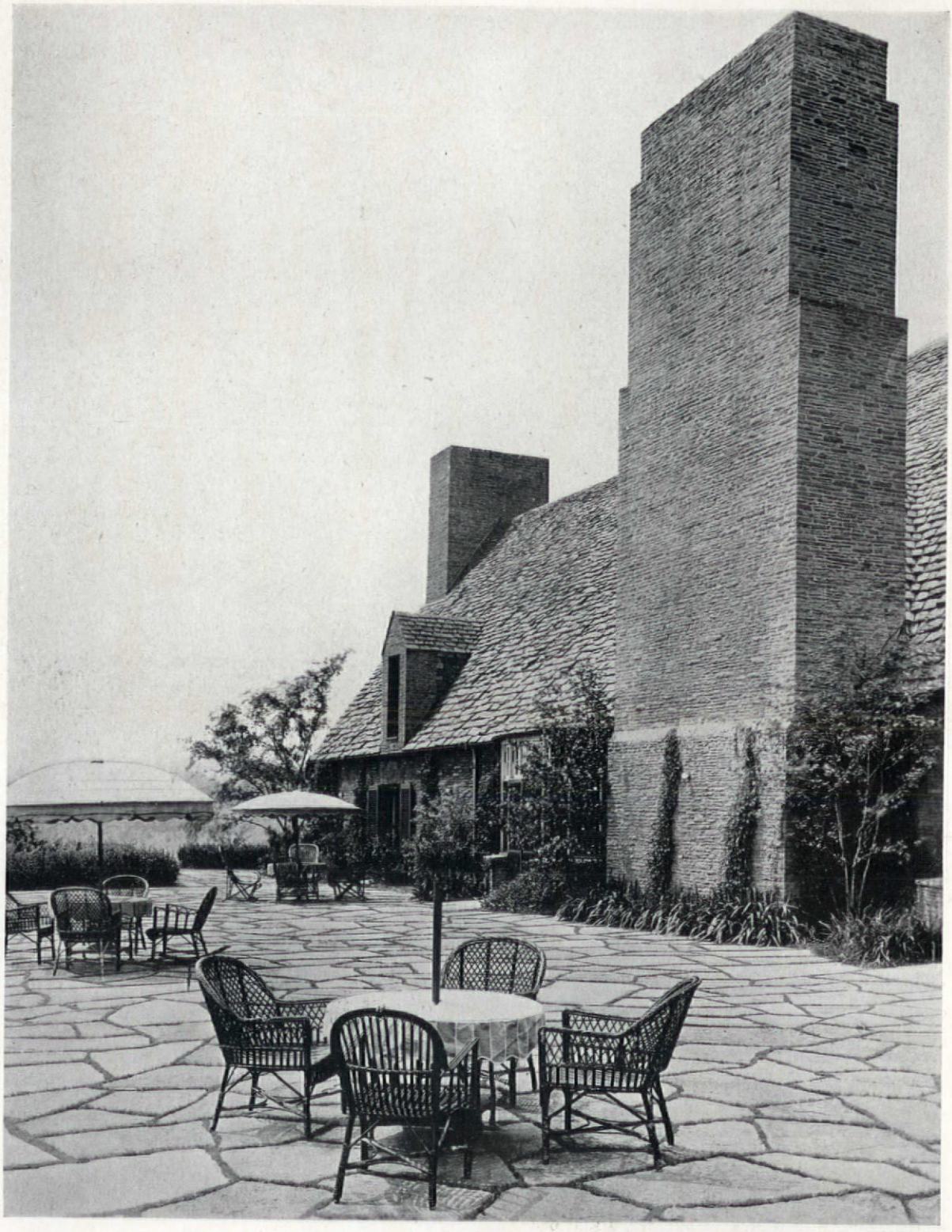


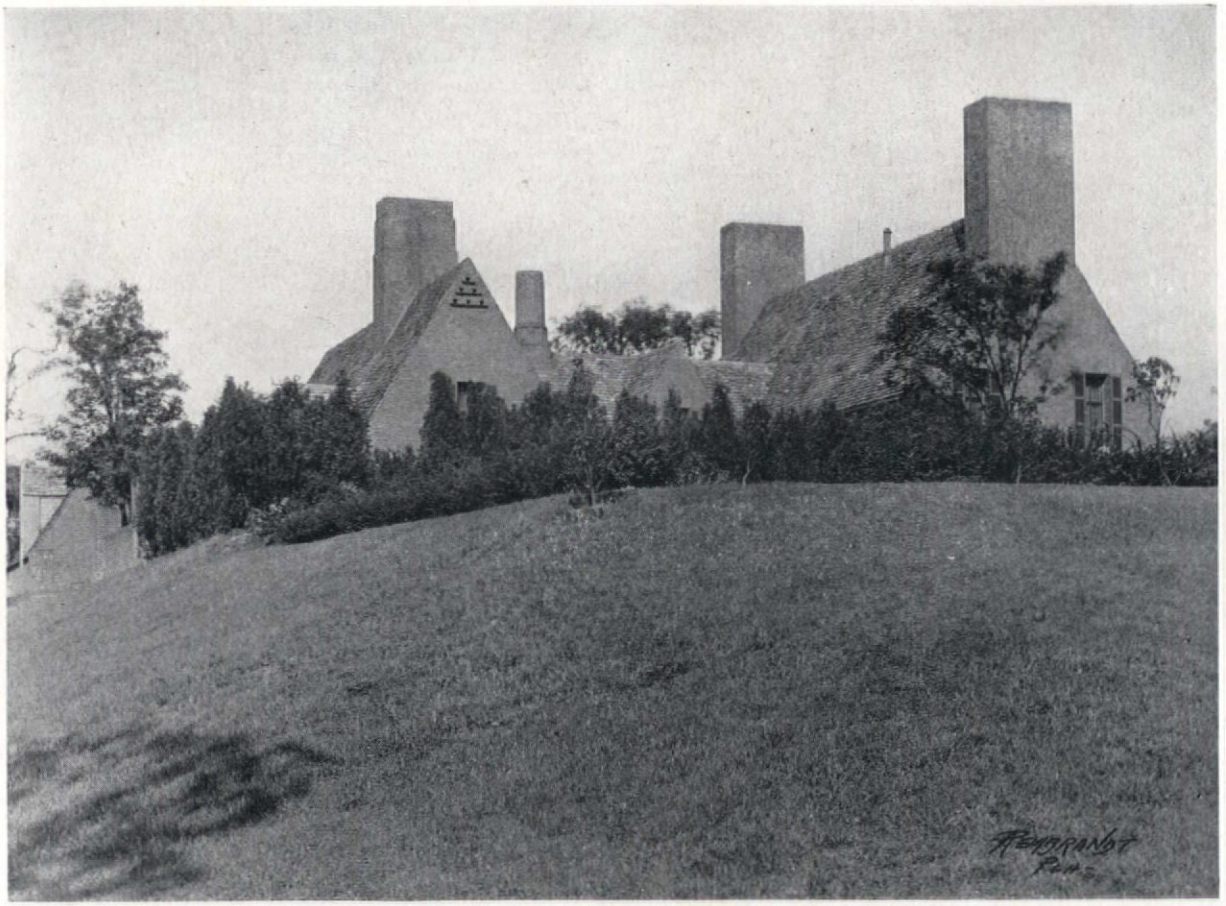
Photo. Rembrandt Studios

LONGUE VUE COUNTRY CLUB, PITTSBURGH, PA.

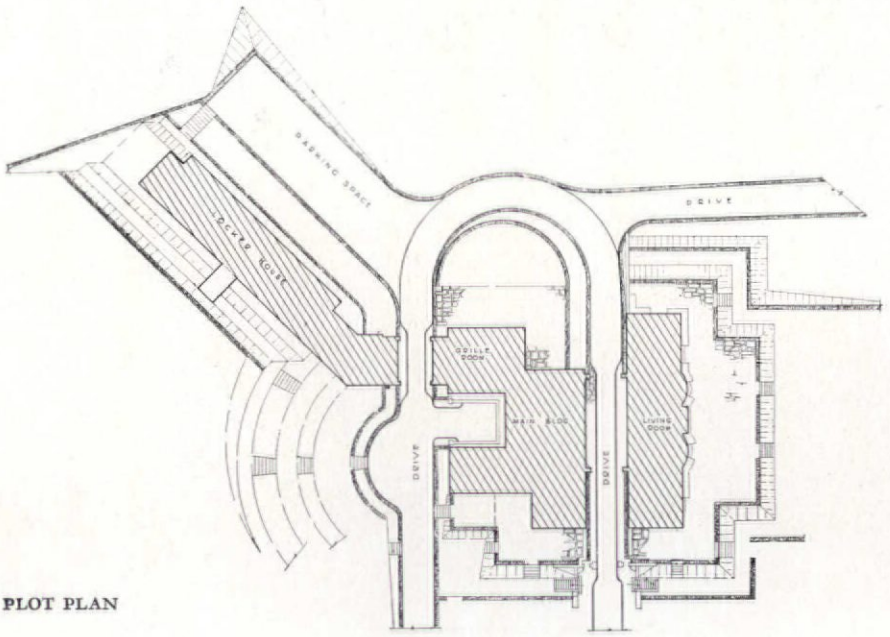
JANSSEN AND COCKEN, ARCHITECTS



LONGUE VUE COUNTRY CLUB, PITTSBURGH, PA.
JANSSEN AND COCKEN, ARCHITECTS



HOUSE FOR MR. EDGAR J. KAUFMANN, PITTSBURGH, PA.
JANSSEN AND COCKEN, ARCHITECTS



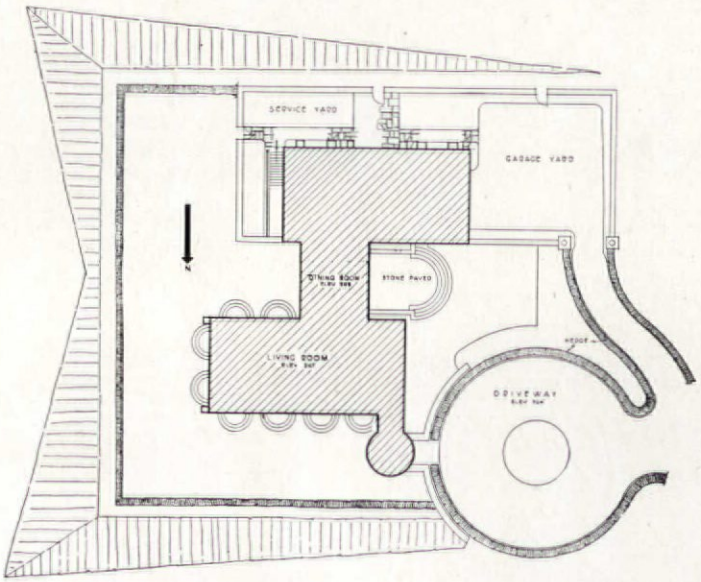
PLOT PLAN

LONGUE VUE COUNTRY CLUB, PITTSBURGH, PA.
JANSSEN AND COCKEN, ARCHITECTS



HOUSE FOR MR. EDGAR J. KAUFMANN, PITTSBURGH, PA.

JANSSEN AND COCKEN, ARCHITECTS



SOME NEW WORK IN CALIFORNIA

BY KEM WEBER

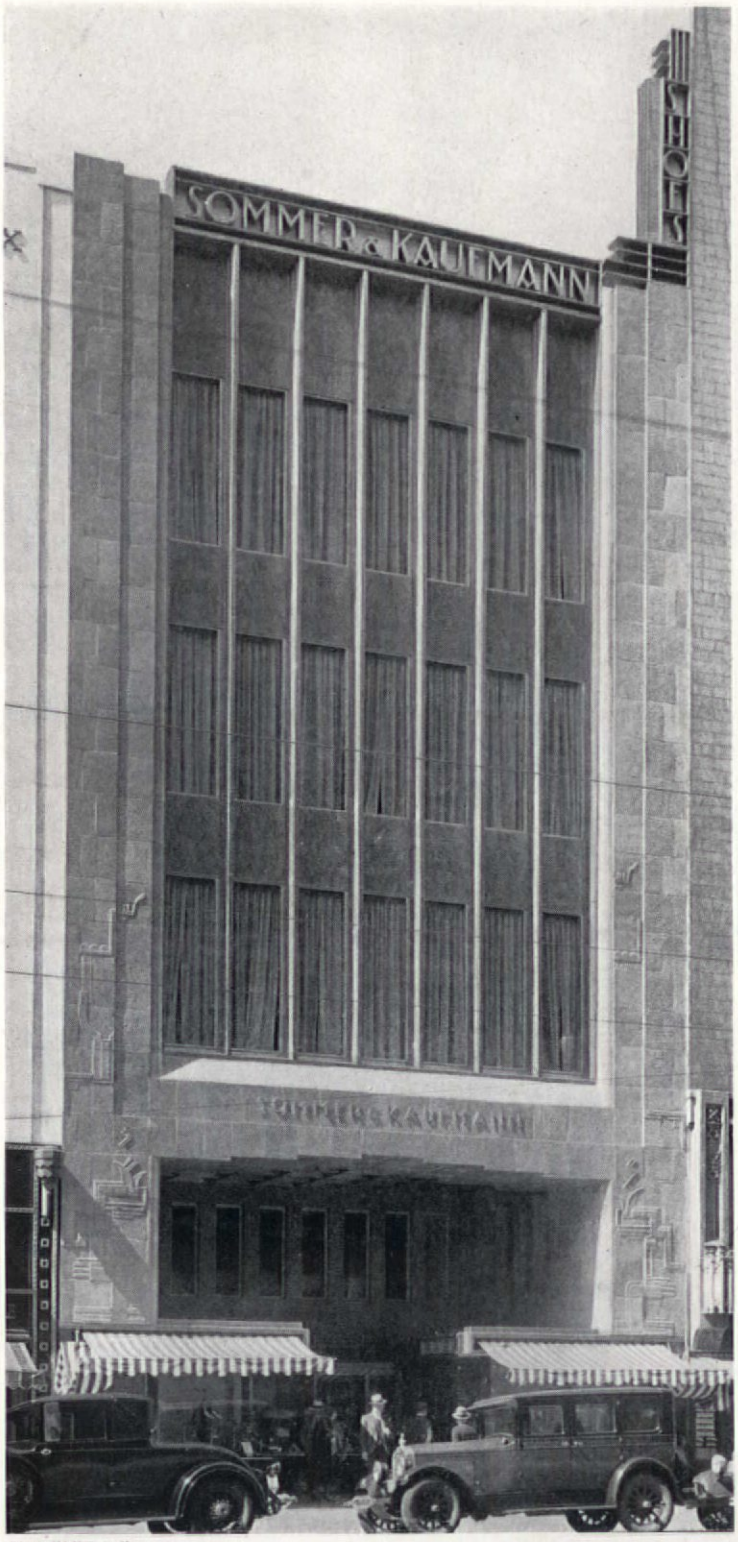


Photo. Will Connell

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

Market Street facade. Gray-green glazed terra cotta with Monel metal muntins and signs. Deep muntins however prevent good access of daylight. Imported Italian marble between windows. A steel hung opening for the main entrance is made to suggest masonry arch construction. Lettering above entrance is not easily read, whereas lettering at top of facade is not readily seen



Photo. Will Connell

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

Entrance Lobby. Elevator doors of chased silver with small glass openings. Lighting fixture of sand-blasted glass and chromium-plated metal. Bas-reliefs by Eugene Maier Krieg



Photo. Will Connell

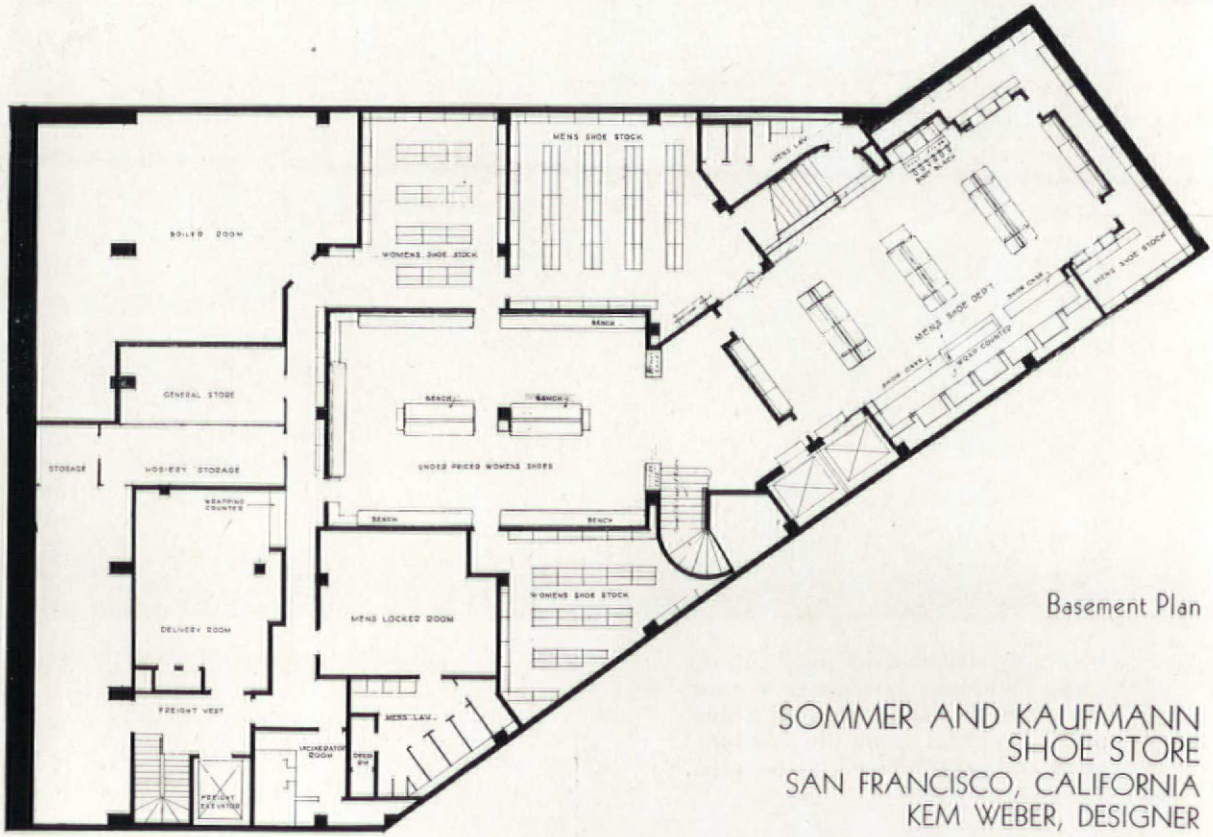
Vestibule with thirteen small display cases. Windows have bases of verdi antique marble and cornices of Monel metal. In ceiling soffit ribs of Monel metal and panels of sand-blasted glass.

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER



Photo, Will Connell

Hosiery alcove in the main sales room. Furniture of American black walnut. Columns of Napoleon melange marble. Walls of varying shades of yellow stucco



Basement Plan

SOMMER AND KAUFMANN SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

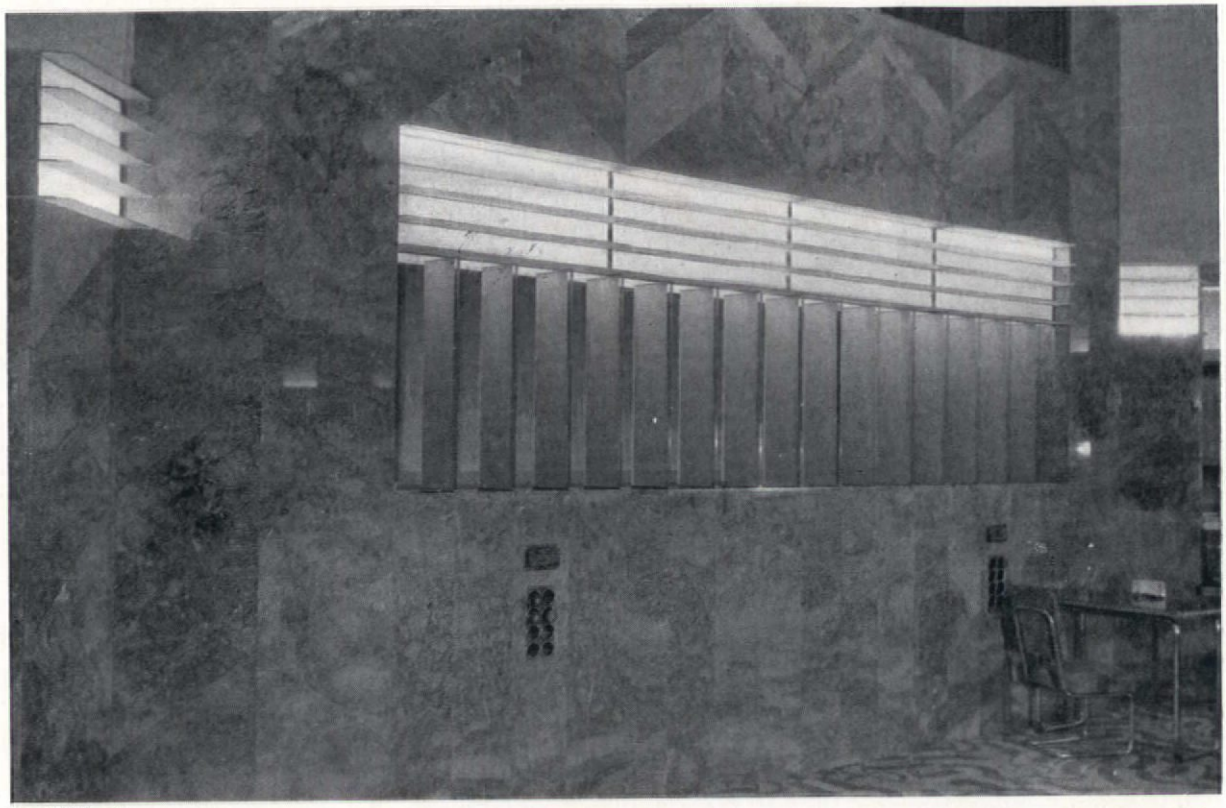
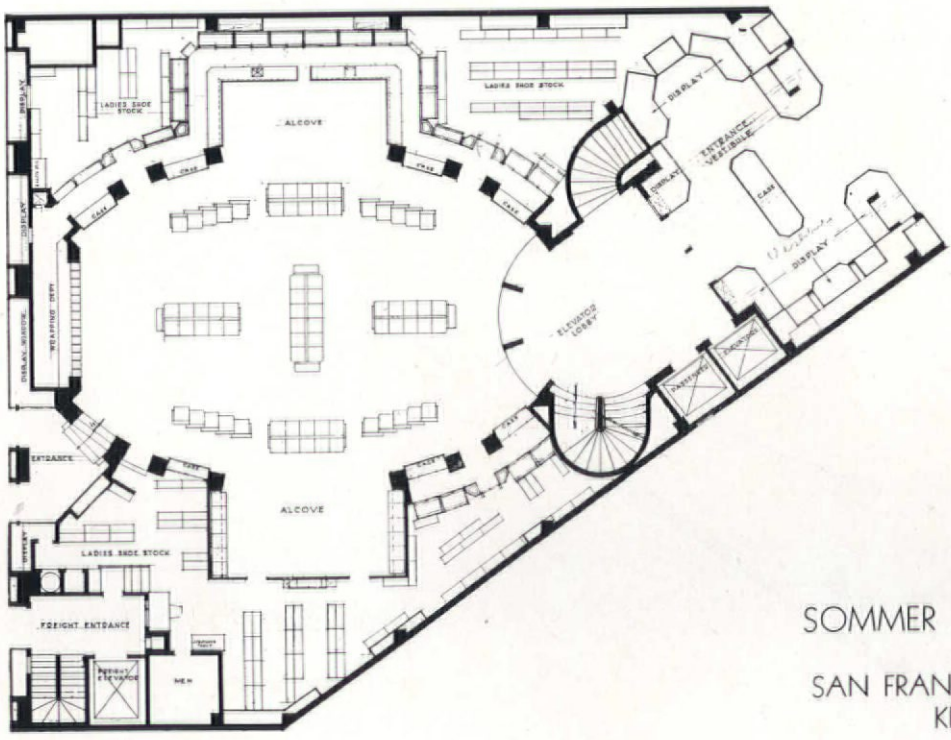


Photo. Will Connell

The wrapping counter is behind this marble wall at the end of the main sales room. The vertical louvres of ½-inch plate glass are so arranged that from any point in the room the salesman can see when his customer's package is ready. A good arrangement. Lamson tubes connect with the cashier and credit department



First Floor Plan

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

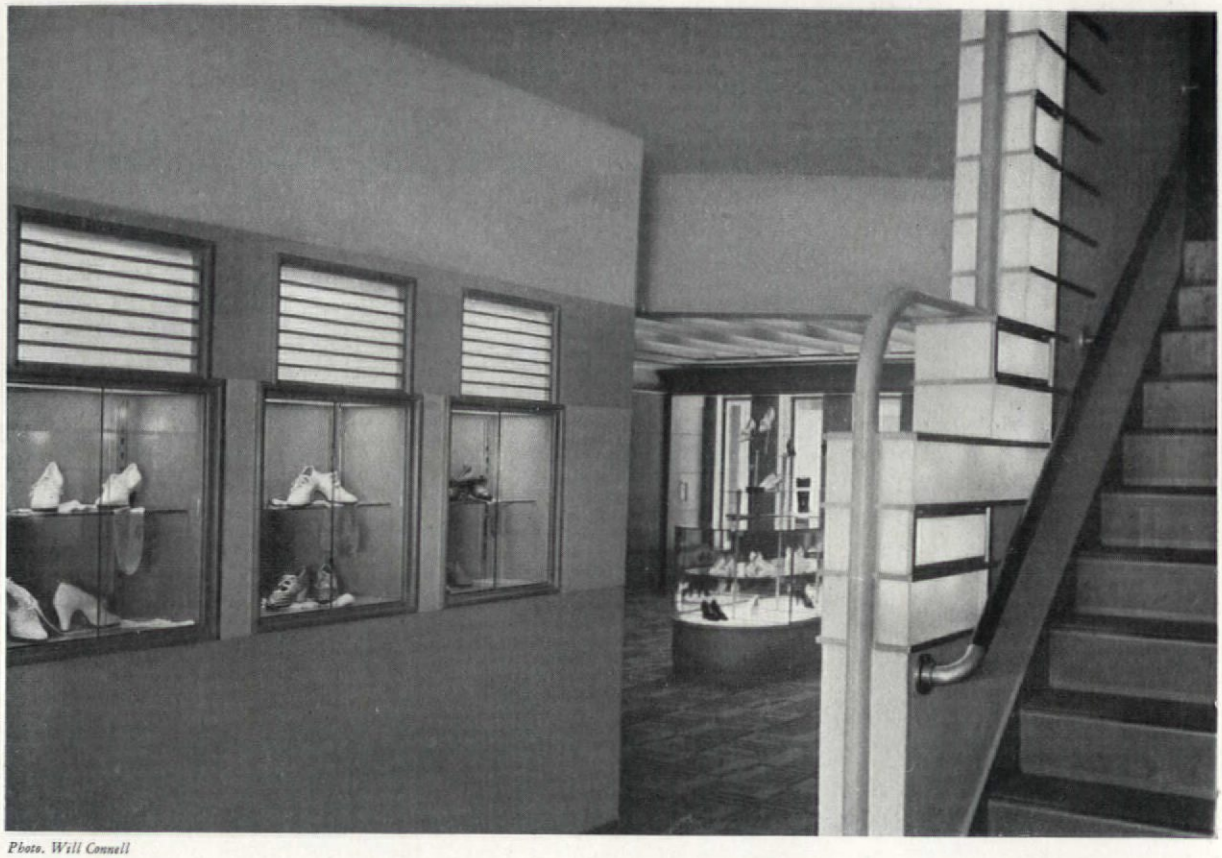
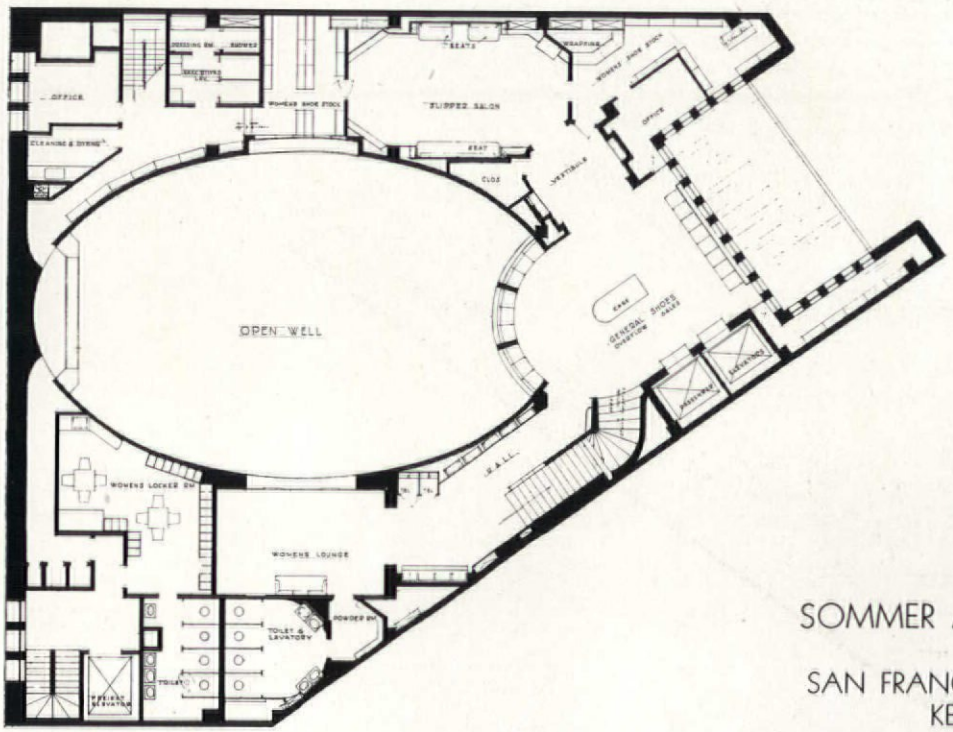


Photo. Will Connell

Detail of integral lighting for stairs on mezzanine floor



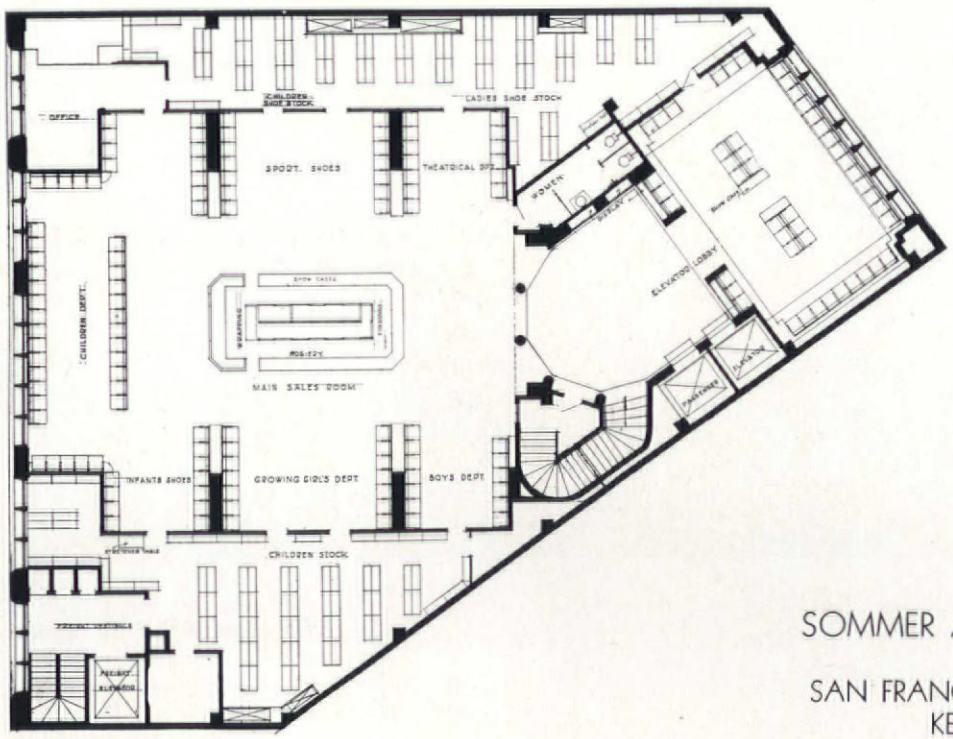
Mezzanine Floor Plan

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER



Photo. Will Connell

Slipper room on the mezzanine floor where formal evening footwear is sold. Color scheme in green. Furniture of Macassar ebony upholstered in metallic fabric. Good straightforward lighting arrangement



Third Floor Plan

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

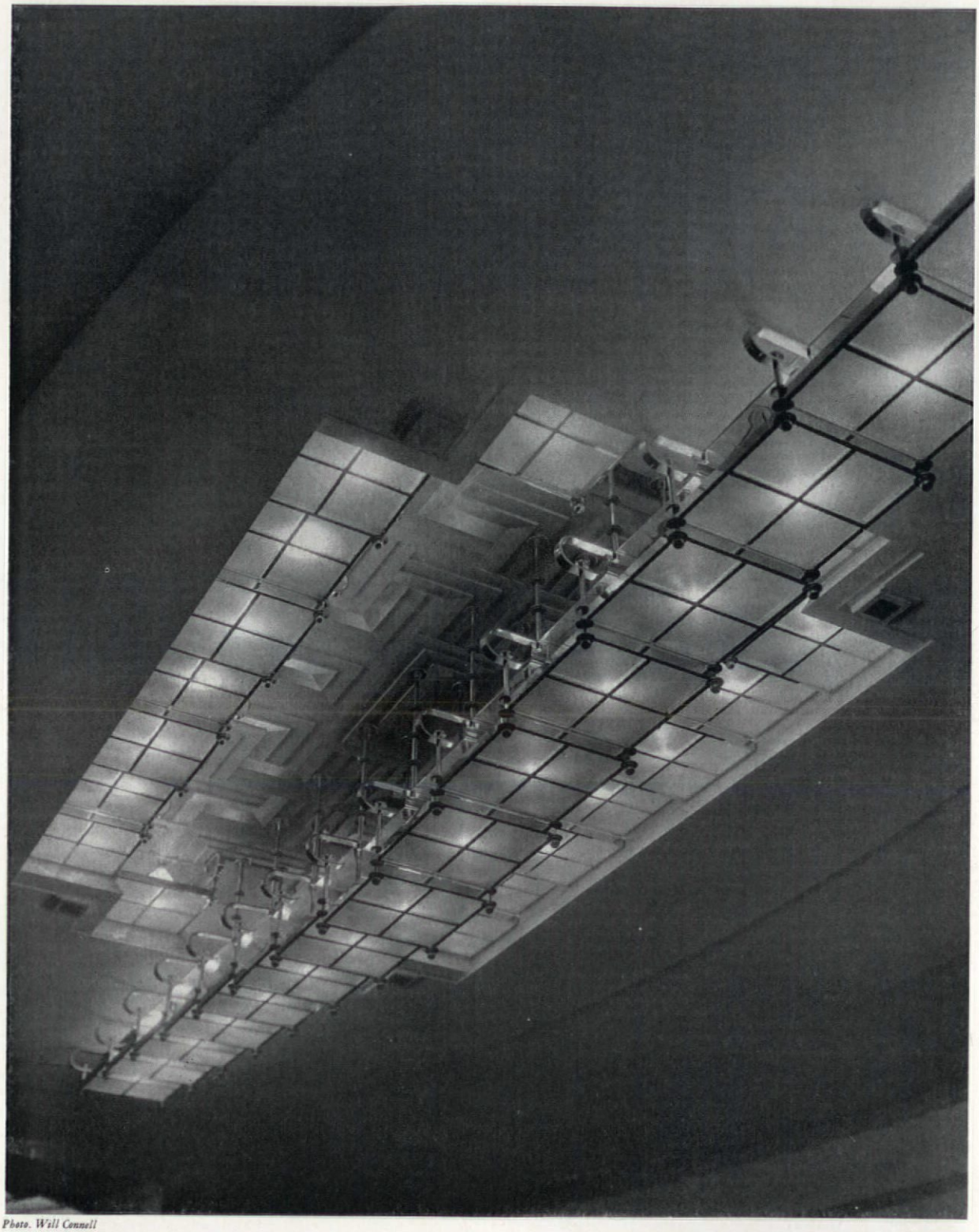


Photo. Will Connell

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

Detail of brass lighting fixture in main sales room, 13′ x 35′ and in two levels with center recessed. Designed to accommodate Holophane lens plates 12-inches square laid in groups of four

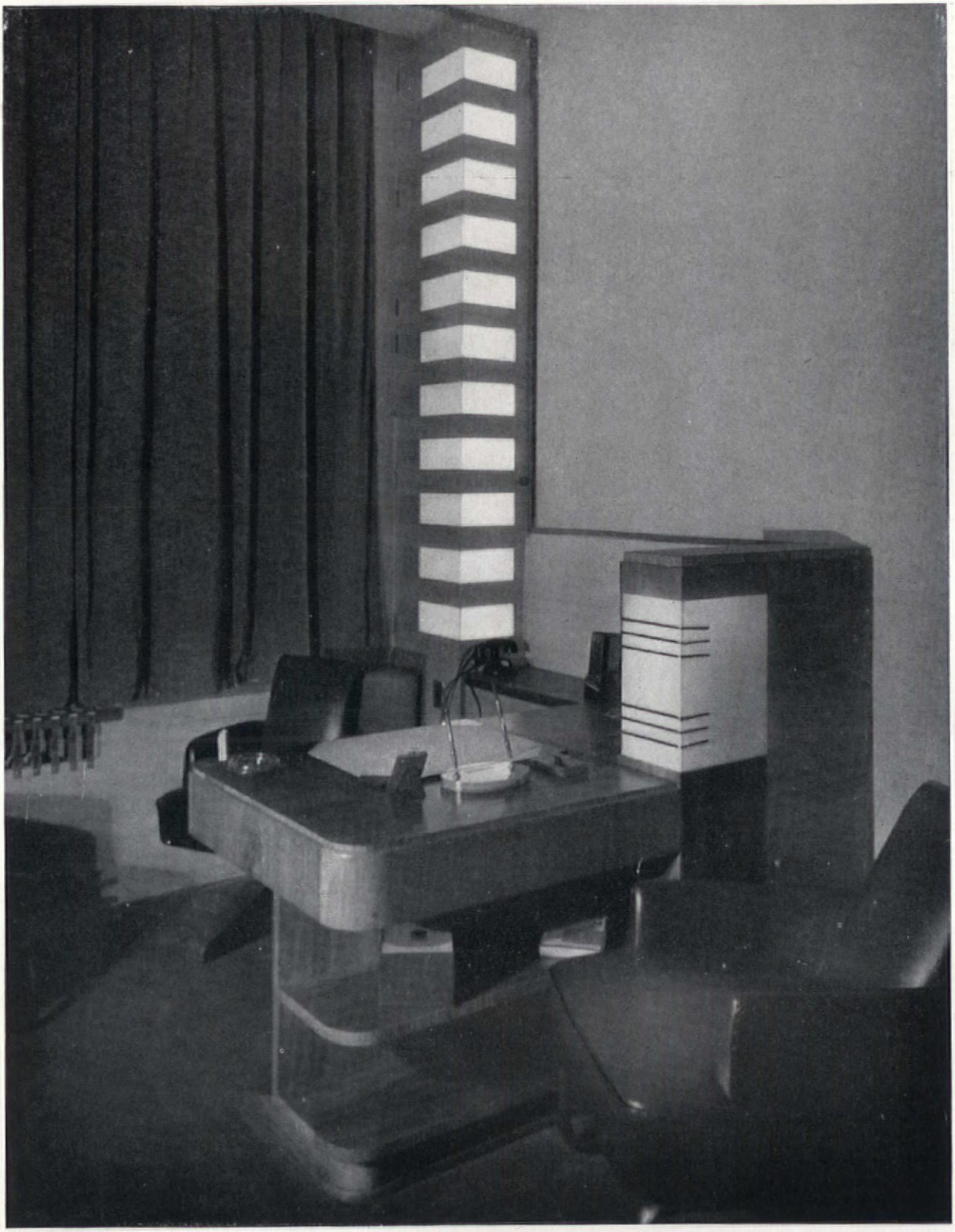


Photo. Will Connell

Private office of executive. Walls of cork tile and plaster. Desk of teak wood. Chairs in blue leather

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER



Photo. Will Connell

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

Children's department showing linoleum floor treatment



Photo. Will Connell

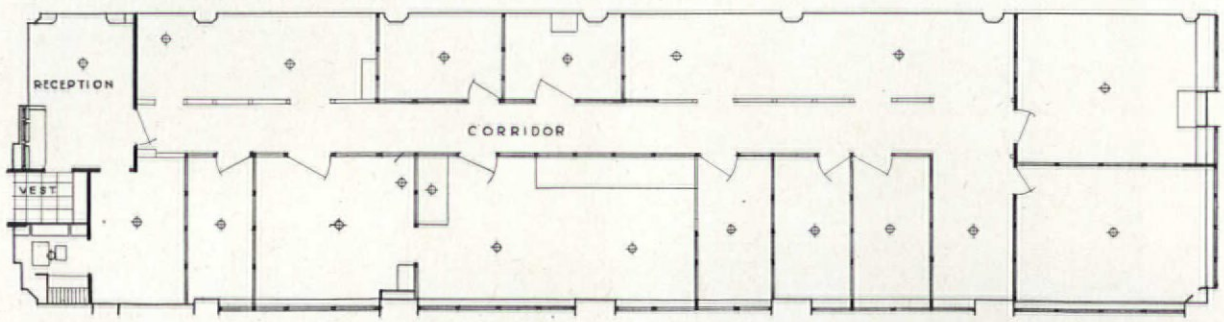
Main sales room with elevator lobby in rear. Gray Italian marble up to mezzanine floor level. Yellow dominating color in carpet

SOMMER AND KAUFMANN
SHOE STORE
SAN FRANCISCO, CALIFORNIA
KEM WEBER, DESIGNER

WORKING DRAWINGS AND PHOTOGRAPHS OF DETAILS

ADVERTISING OFFICES OF THE MAYERS COMPANY

LOS ANGELES, CALIFORNIA



PLAN OF OFFICE LAYOUT

Remodeling Designed By Kem Weber

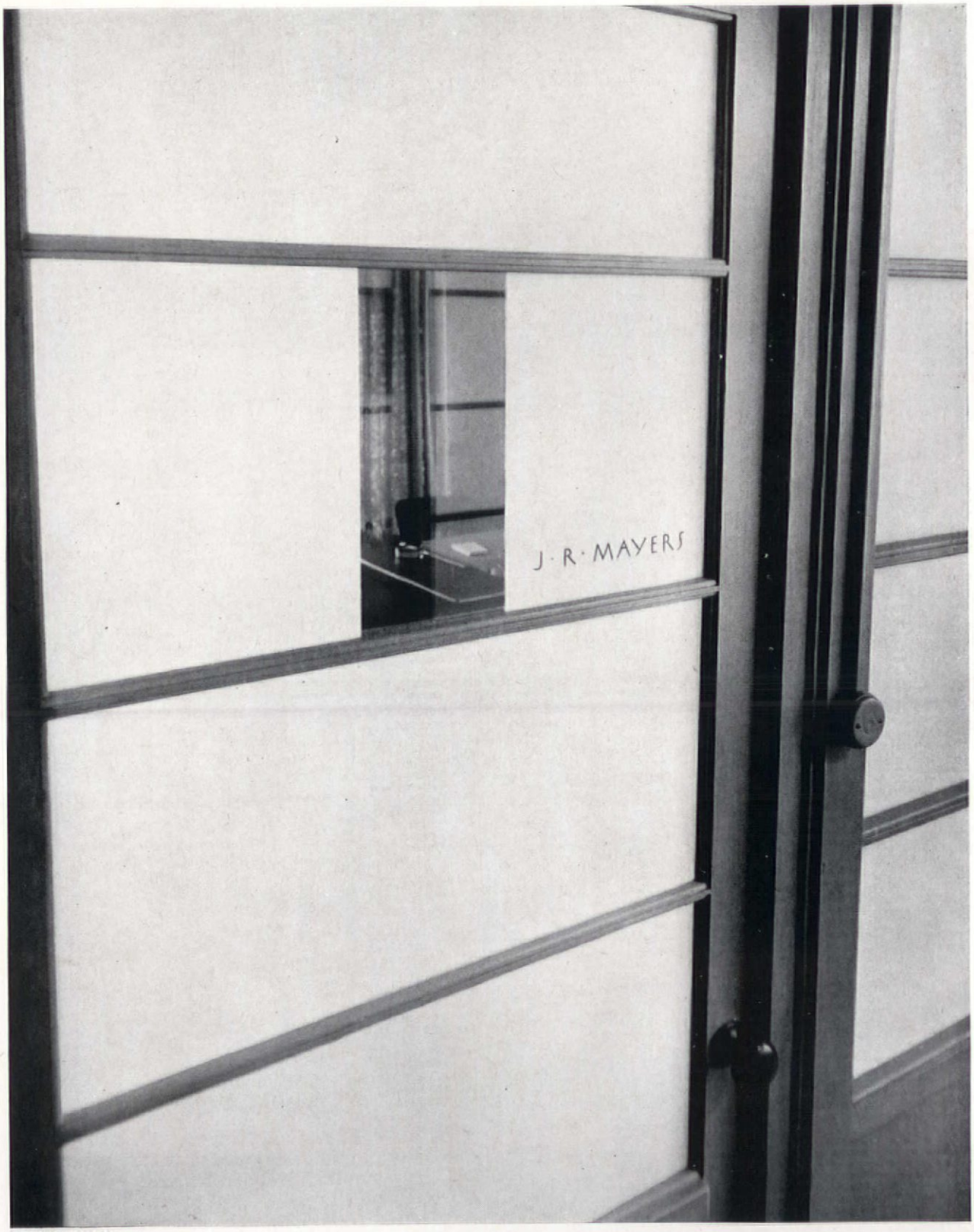
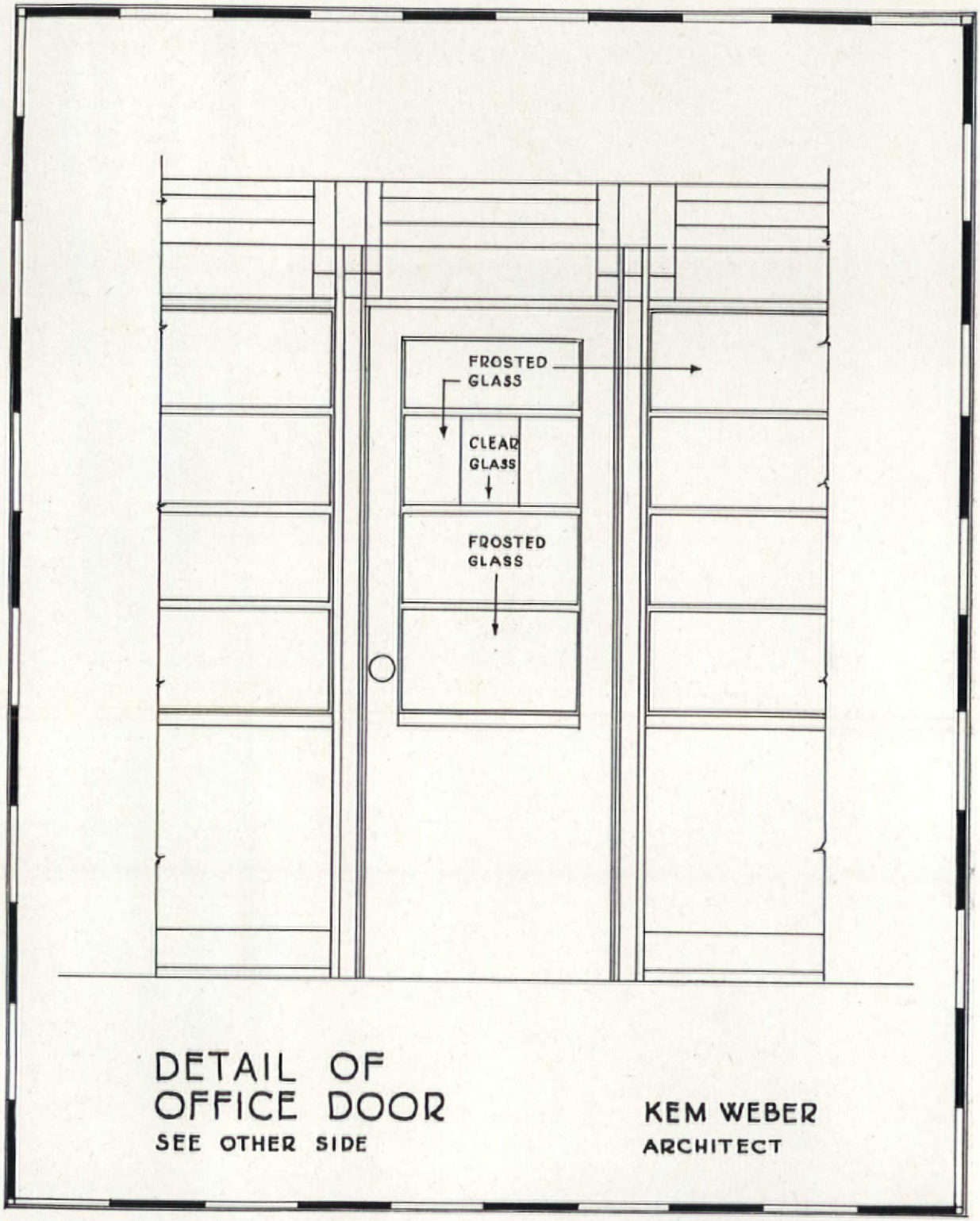


Photo. Willard D. Morgan

Each private office has a small unfrosted square of glass permitting one to look in without disturbing any special meeting or conference by opening the door

ADVERTISING OFFICES OF THE MAYERS COMPANY, LOS ANGELES
KEM WEBER, DESIGNER



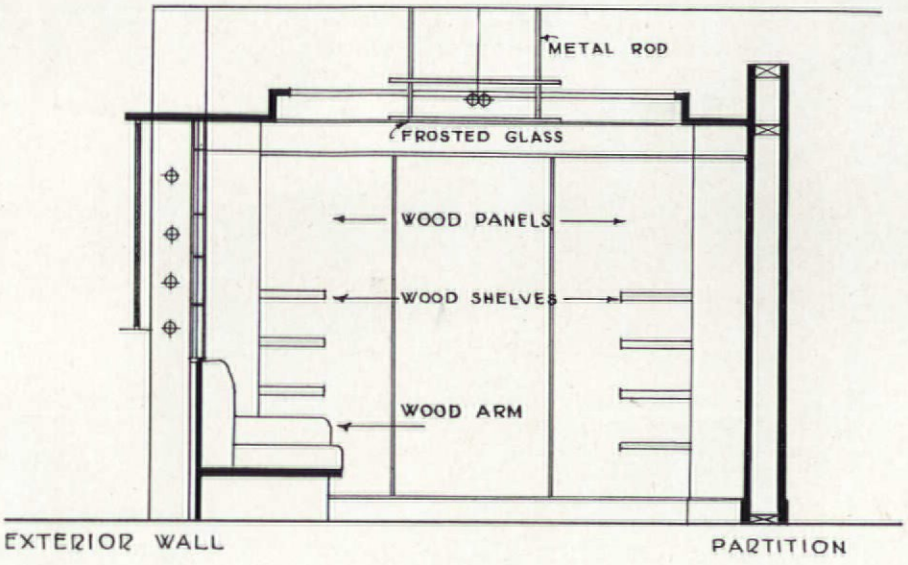
ADVERTISING OFFICES OF THE MAYERS COMPANY, LOS ANGELES



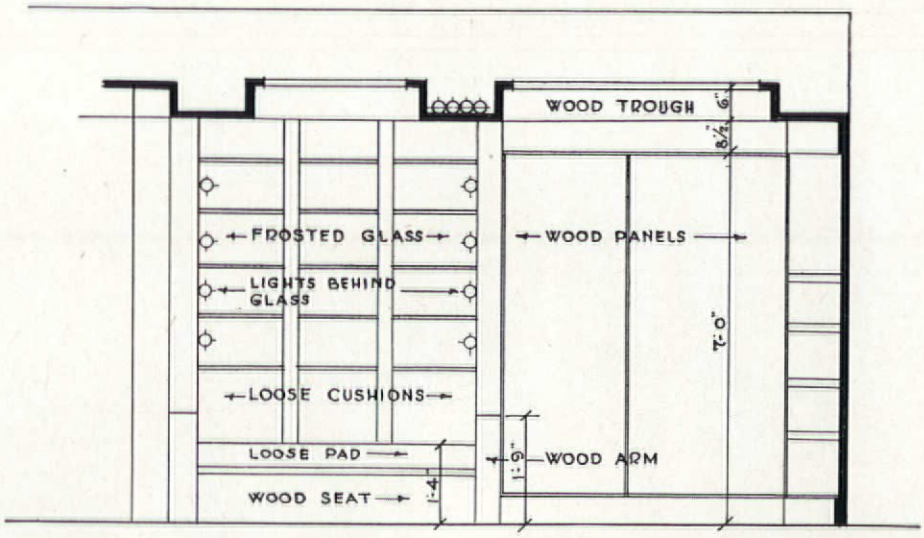
Photo. Willard D. Morgan

This entrance has a telephone booth at the right

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SECTION

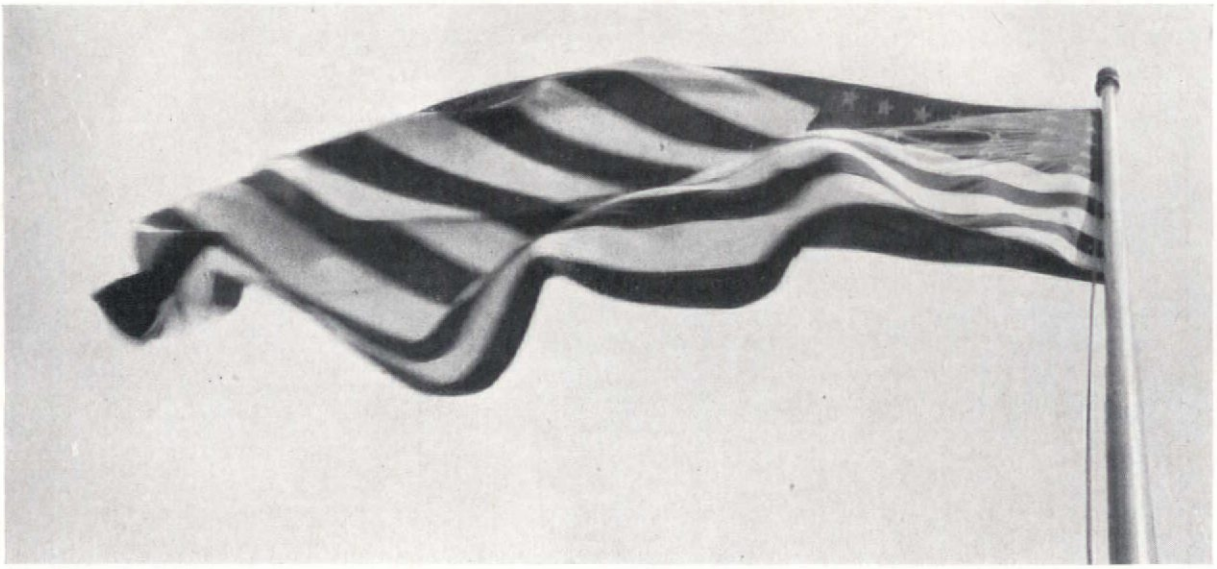


DETAILS OF RECEPTION ROOM

KEM WEBER ARCHITECT

ADVERTISING OFFICES OF THE MAYERS COMPANY, LOS ANGELES

NOTES ON DRAFTING AND DESIGN



THE DESIGN OF VERTICAL TUBULAR STEEL FLAGPOLES

BY S. J. WARBERG

The required strength of a flagpole at any point is governed by the more severe of two conditions:

(a) When a flag is flown from the pole, the strength required is governed by the size of the flag and the maximum velocity of the wind. This velocity may safely be assumed at 60 miles an hour, as a flag would be either pulled down before this velocity was attained or be torn to pieces.

(b) When no flag is flown from the pole, the strength required is governed by the maximum wind velocity recorded in the locality in question.

When these conditions are known, the pole may be designed for any height. The work is of a tedious cut-and-try character as the action of the wind on the pole itself accounts for a considerable portion of the governing bending moment, and indeed for high maximum wind velocities and the smaller sizes of flags may be the governing criteria above certain heights of poles.

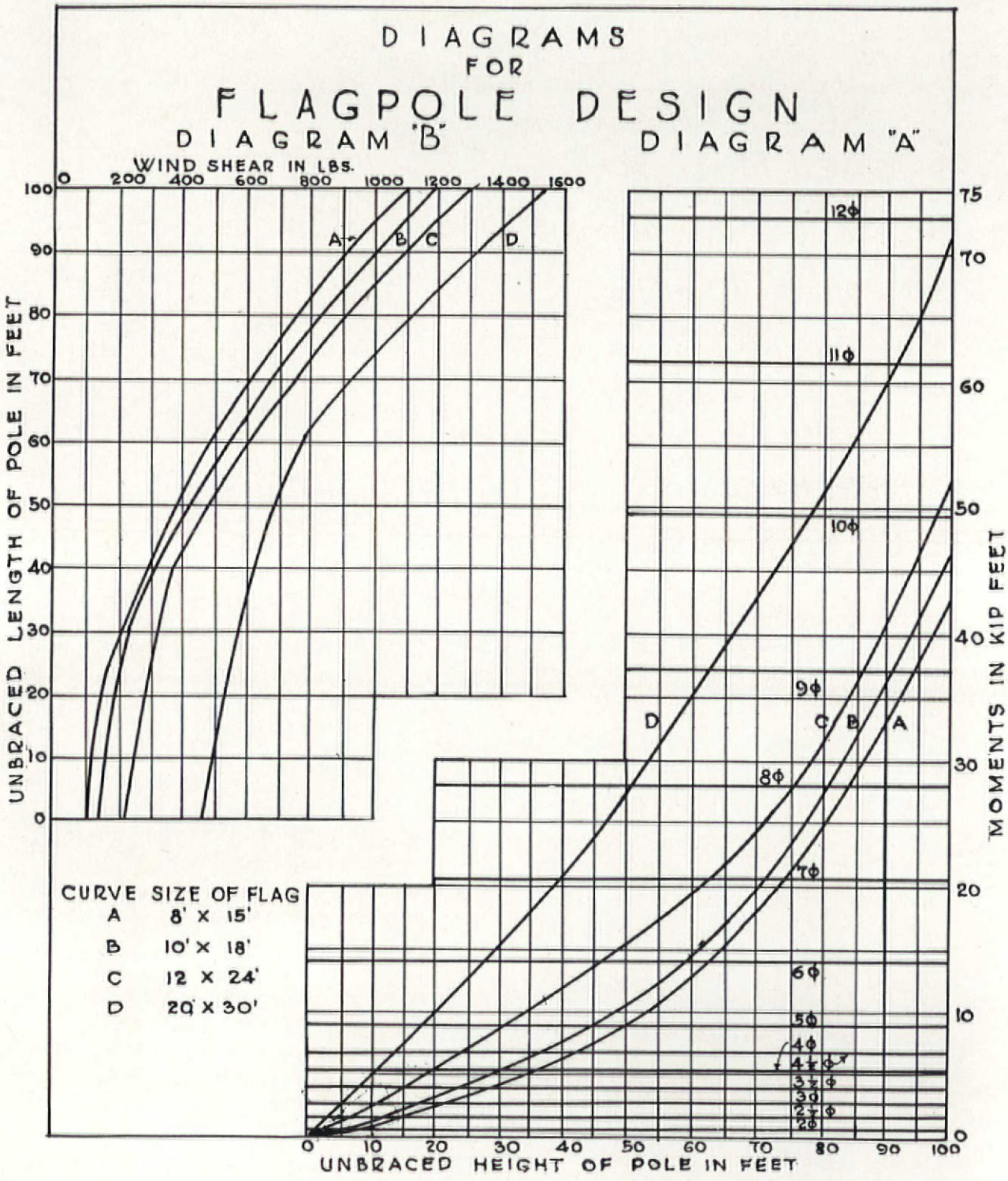
For the purpose of lightening this task, the writer has prepared curves giving bending moments and shears on four designs which are suggested as covering the most common requirements.

•

Certain manufacturers of tubular steel flagpoles follow the practice of placing a weaker section halfway down the pole to insure a failure where the least harm will result, in case of record-breaking wind storms. This would seem good practice.

The accompanying diagrams were worked out for conditions obtaining in Detroit and vicinity and for tubular steel poles with a maximum fibre stress of 20,000 pounds per square inch, as allowed by the City of Detroit Building Department.

The maximum observed actual wind velocity for this vicinity is 86 miles an hour. In the designs suggested, a maximum velocity of 90 miles an hour has been used on poles without flags. For poles with flags a velocity of 60 miles an hour has been used.



Inquiry revealed certain customs and usages with regard to **selection of sizes of flags** and height of poles, which are given below simply as a guide in selection:

(a) For school buildings, the following flag sizes are in common use: 5′ x 8′, 6′ x 10′, 6′ x 12′, and 8′ x 12′.

(b) For public buildings, the following sizes are used: 8′ x 15′, 9′ x 18′, 10′ x 18′, and 10′ x 20′.

(c) For tall office buildings, the flag sizes vary from 10′ x 15′ to 20′ x 30′, according to height of building.

All above flag sizes are known as "fair weather flags." In stormy weather, flags used are generally one-half these sizes.

The weather bureau, however, reports that a great many of the most violent wind storms recorded have come up during the early afternoons when "fair weather flags" were flying from the poles.

•

It would therefore hardly be advisable to design for any but fair weather sizes of flags, and this has been followed in the accompanying diagrams.

•

In general the height of pole is roughly proportioned to the size of the flag selected as follows:

On buildings not over five stories in height, the height of pole should be about three times the length of the flag. On buildings over five stories in height, the height of the pole should be about twice the length of the flag.

•

In calculating moments the pull of the flag on the pole was determined by the so-called "Navy Formula":

$$P = 0.0003\ Av^{1.9}$$ where

P = pull of flag on pole, in pounds, applied at top of flagpole,
A = area of flag in square feet,
v = velocity of wind in miles per hour, actual.

The pressure of wind on the pole itself was calculated by the formula:

$$P = 0.0025\ v^2\ d\ l$$, where

P = total wind pressure on a section of pole in pounds,
d = diameter of section in feet,
l = length of section in feet,
v = velocity of wind in miles per hour.

Diagram "A" gives maximum bending moments on four designs of poles A, B, C and D.

DESIGN

A is for flags up to and including 8′ x 15′
B is for flags up to and including 10′ x 18′
C is for flags up to and including 12′ x 24′
D is for flags up to and including 20′ x 30′

On all flagpoles, a finial was taken into consideration, consisting of a 12-inch diameter ball at 2 feet above top of flag. Height of poles is in all cases to top of flag.

Horizontal lines in Diagram "A" mark the resisting moments at a fibre stress of 20,000 pounds per square inch of standard steel pipe of the diameters given.

The designs are given in Table I, following page.

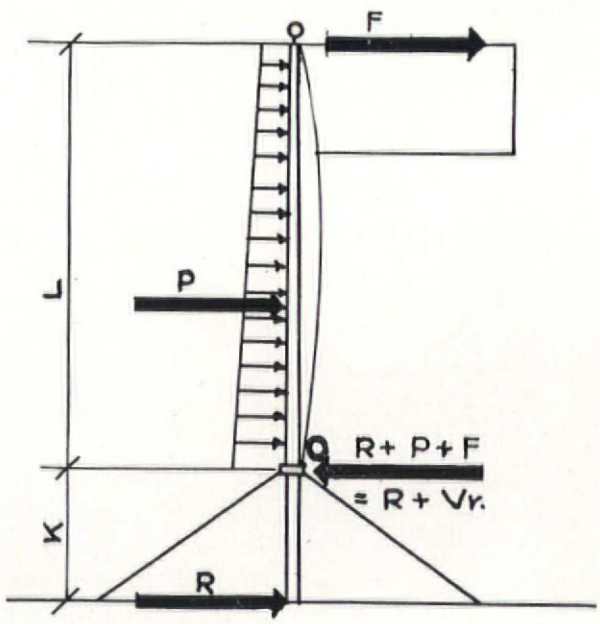


DIAGRAM "C"

TABLE I. PIPE SIZES FOR DESIGN OF FLAGPOLES

Size of Standard Pipe Inches	O. D. of Pipe Inches	Wt. per ft. of Pipe in lbs.	Length of Section in ft.			
			Pole Design "A"	Pole Design "B"	Pole Design "C"	Pole Design "D"
2″	2.375	3.652	6.5	6.0	....	....
2½″	2.875	5.793	5.0	4.5	....	....
3″	3.50	7.575	11.5	5.5	11.0	6.0
3½″	4.00	9.109	6.0	5.5	5.0	2.5
4″	4.50	10.790	6.0	5.5	5.0	3.0
4½″	5.00	12.538	6.5	6.0	5.0	....
5″	5.625	14.617	7.0	7.0	6.0	7.5
6″	6.625	18.974	13.5	13.5	14.0	9.5
7″	7.625	23.544	10.0	14.0	14.0	10.0
8″	8.625	28.554	10.5	13.5	14.0	11.5
9″	9.625	33.907	11.0	9.0	10.0	12.5
10″	10.75	40.483	12.0	12.0	12.0	15.0
11″	11.75	45.557	....	....	9.0	12.0
12″	12.75	49.562	....	....	....	11.0
Total Height of Poles in feet.....			105.5	102.0	105.0	100.5

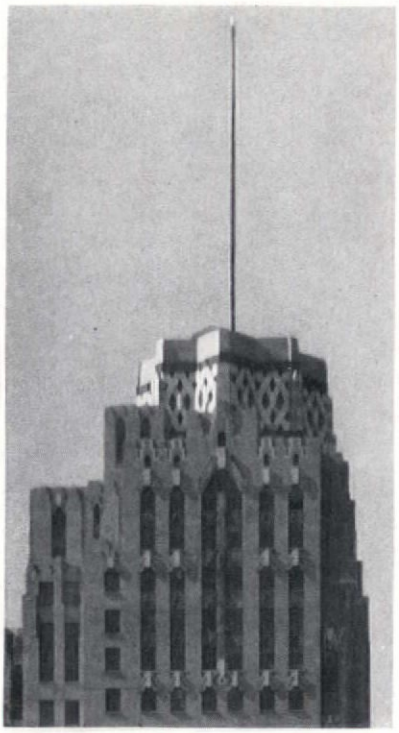
In practice it has been found that simply specifying "standard pipe" is not sufficient, as the contractor will almost invariably supply "standard gas pipe," which is much lighter and consequently weaker; the only safe way is to specify also the minimum total weight of the pole.

The pipe sizes given are *nominal* or approximate *inside* diameters of the pipe, but

EXAMPLE ILLUSTRATING USE OF TABLE I

As **an example** suppose a 60-foot pole is desired for a flag 10′ x 18′, or design "B". It is merely necessary to start at the *top* of design B and use sections from the top down, enough to give a total length of at least 60 feet; that is:

2″ pipe	6′-0″ + 2′-0″ in telescoped joint	wt. = 8 x 3.652 lbs.	= 29.2 lbs.
2½″ pipe	4′-6″ + 2′-0″ in telescoped joint	wt. = 6.5 x 5.793 lbs.	= 37.6 lbs.
3″ pipe	5′-6″ + 2′-0″ in telescoped joint	wt. = 7.5 x 7.575 lbs.	= 56.8 lbs.
3½″ pipe	5′-6″ + 2′-0″ in telescoped joint	wt. = 7.5 x 9.109 lbs.	= 68.3 lbs.
4″ pipe	5′-6″ + 2′-0″ in telescoped joint	wt. = 7.5 x 10.79 lbs.	= 81.0 lbs.
4½″ pipe	6′-0″ + 2′-0″ in telescoped joint	wt. = 8.0 x 12.538 lbs.	= 100.2 lbs.
5″ pipe	7′-0″ + 2′-0″ in telescoped joint	wt. = 9.0 x 14.617 lbs.	= 127.3 lbs.
6″ pipe	13′-6″ + 2′-0″ in telescoped joint	wt. = 15.5 x 18.974 lbs.	= 294.0 lbs.
7″ pipe	6′-6″	wt. = 6.5 x 23.544 lbs.	= 153.0 lbs.
	Total length = 60′-0″	Total wt. of pole = 947.4 lbs.	



FLAGPOLE ON UNION TRUST BUILDING
DETROIT, MICH.

the contractor is prone to assume this as the outside diameter (thus giving a weaker pole) unless the outside diameters are given on the detail.

•

Diagram B gives the total shears on these four designs which may be used in the design of the support of the poles as follows (see Diagram C):

Given: Size of flag and height of Pole = L.

K is determined by circumstances of location.

Then:

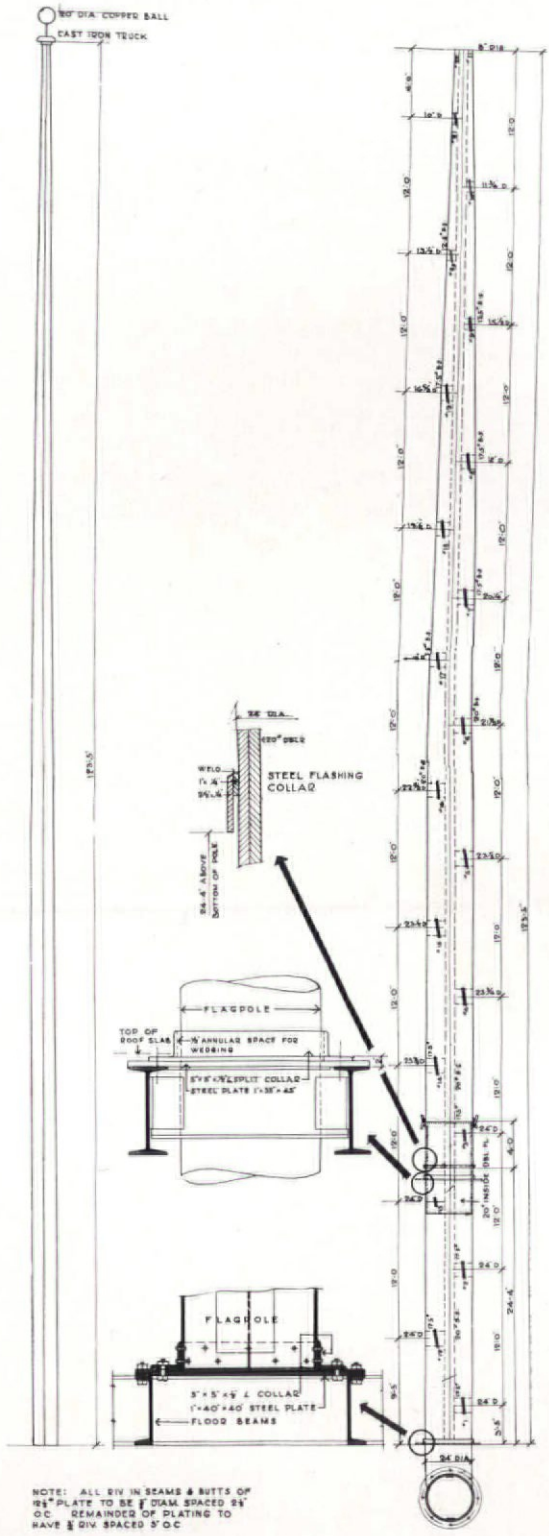
From Diagram "A", obtain Moment M_T for height L on nearest larger type of pole.

Moment at O is $M_T = K\ R$, from which

$$R = \frac{M_T}{K}$$

Maximum shear due to wind occurs just above O and may be obtained from Diagram "B" for height L and nearest larger type of pole. Let this be Vt.

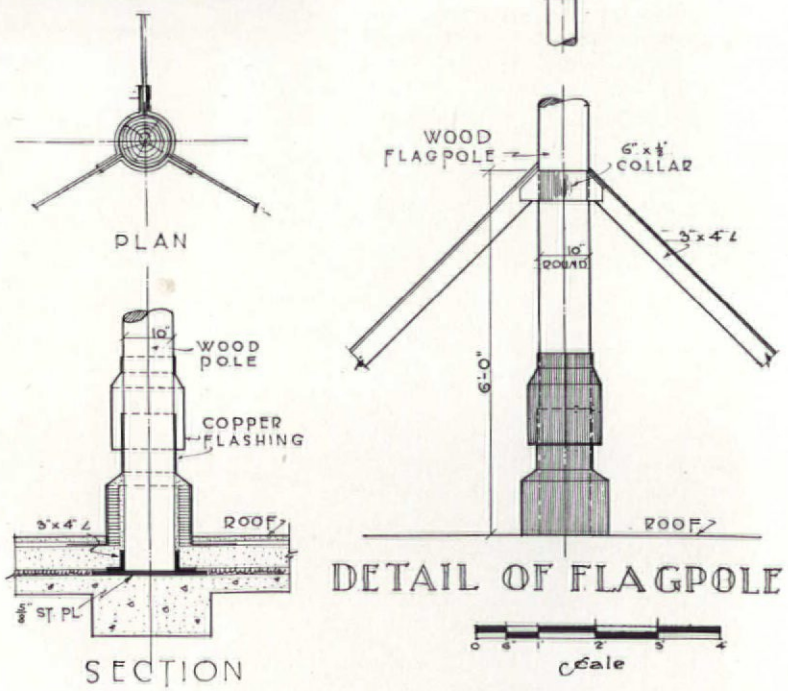
With these quantities known, the design of the bracing support for the pole is simple.



DETAIL DRAWING OF FLAGPOLE ON UNION TRUST BUILDING
DETROIT, MICHIGAN
SMITH, HINCHMAN AND GRYLLS, ARCHITECTS AND ENGINEERS



FLAGPOLE ON TOWER
NEW YORK LIFE BUILDING



FLAGPOLE

The support and protection of a flagpole mounted on a roof top should be reduced to simplest construction. A pole up to forty feet may be of wood, preferably of clear spruce. Brace with single irons and flash base with copper

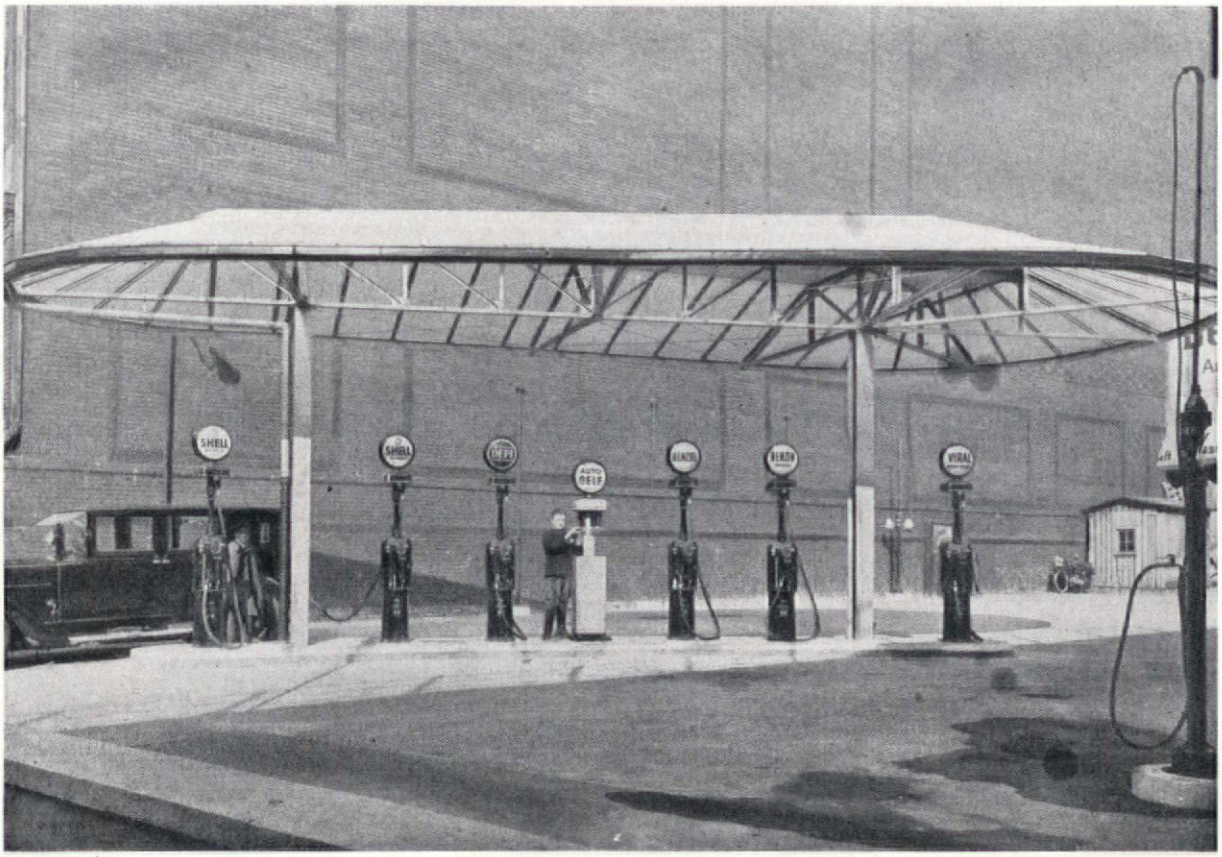
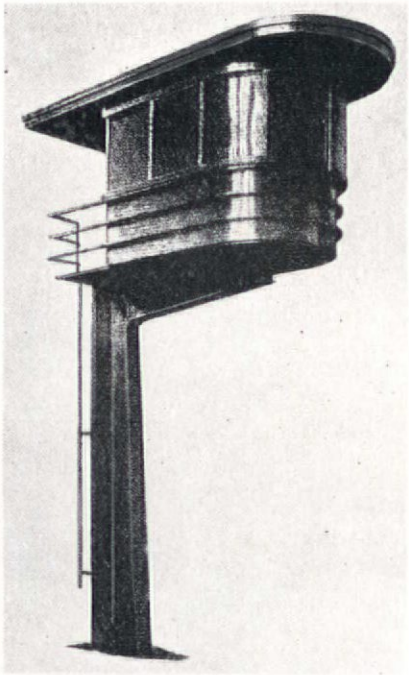
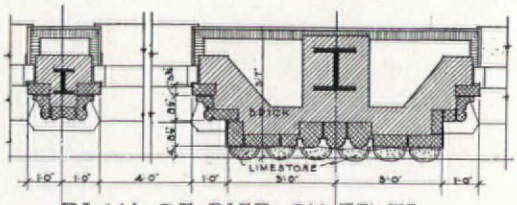


Photo Krajewsky

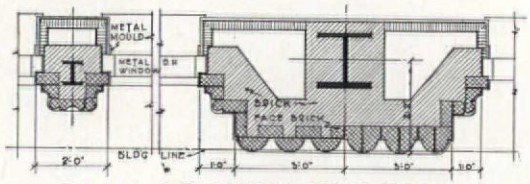
Filling Station in Berlin. Heinrich Kosina, Architect. Note the light construction of the canopy and the slender supports. See article: "The Gasoline Filling and Service Station" in the June Issue of THE ARCHITECTURAL RECORD



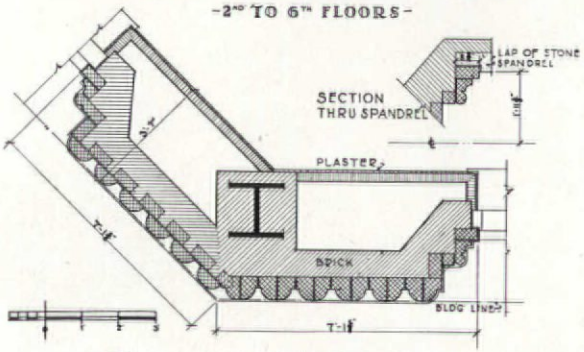
Traffic Tower, Berlin, Mies van der Rohe, Architect. The cantilevered support insures a minimum of obstruction to the street traffic



PLAN OF PIER ON 7TH FL.



PLAN OF MULLION & PIER
-2ND TO 6TH FLOORS-



PLAN OF CORNER PIER
-2ND TO 6TH FLOORS INCL.-



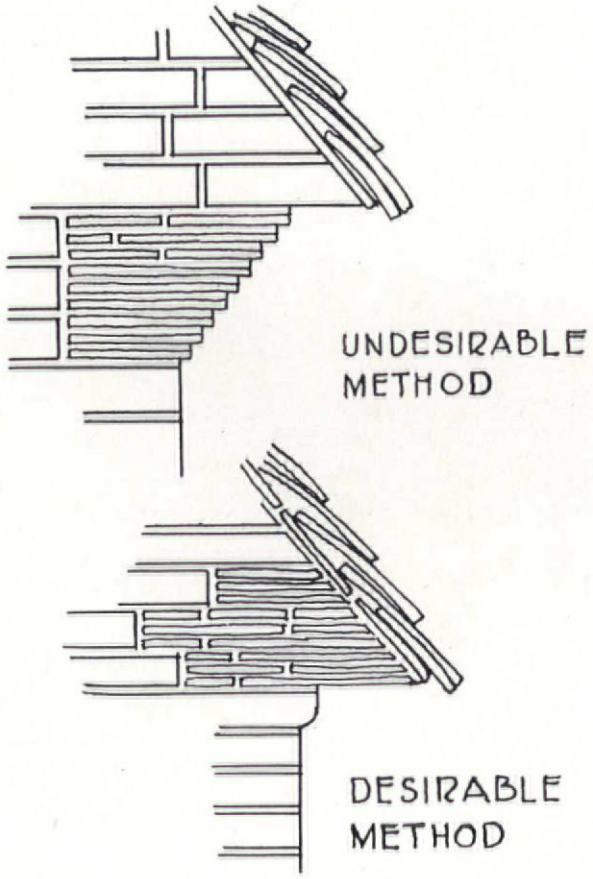
DETAILS OF BRICK PIERS AND MULLIONS
ABRAHAM AND STRAUS BUILDING, BROOKLYN
STARRETT AND VAN VLECK, ARCHITECTS

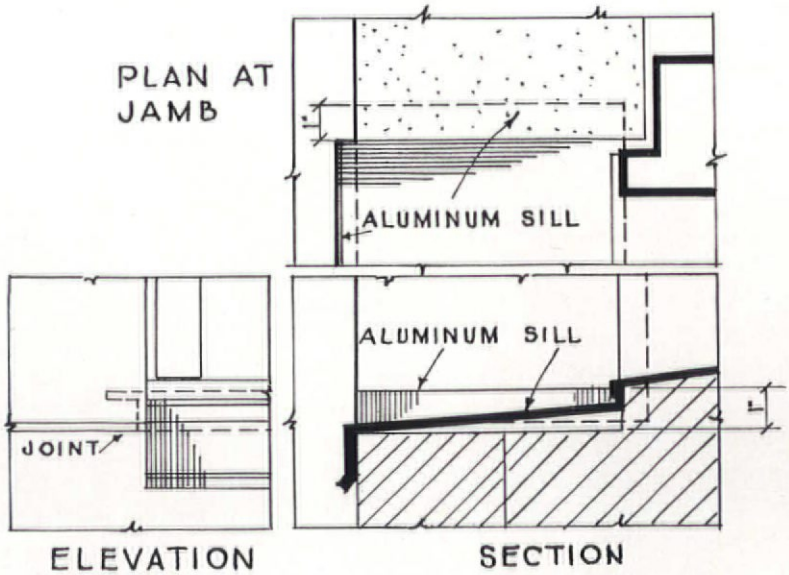
PARALLEL STRAIGHT-EDGE

Few draftsmen know that the parallel straight-edge attachment, now in general use, can easily be adjusted for drawing views or projections at an angle. Ordinarily, the draftsman does this work with triangles, which are not very accurate and which require more time than when working from a horizontal line. The parallel straight-edge can be pulled around to any angle from 1 to 30 deg. When this is done, the cord which extends along the top of the drawing board moves laterally. An indicating scale can easily be scribed on the board so that, when occasion arises to show a view at an inclination, the draftsman can pull the straight-edge around to the desired angle as determined by the scale and hold the cord in position with a thumbtack, working in the same manner as if from a horizontal line.—Morton Schwam, Philadelphia, Pa. From Engineering News-Record June 12, 1930.

GABLE ENDS WRONG AND RIGHT

Brick gable ends with corbelled tile for overhang may be detailed to eliminate wood crown mold. The flat tile should project the thickness of the end wall but not the brickwork. Heavy slate may be substituted for tile. (From the Architect's Journal, London, May 22, 1929)





DETAIL OF ALUMINUM SILL

WATERPROOFING SILLS

Sills may be of aluminum or stainless metal alloy, making stone or brick sills unnecessary. There are advantages to such construction as the sill may then be built integral with the sash and a more complete watertightness insured. Sills of extruded aluminum or alloy should be specified 3-16 inch thick, cast sills to be ¼ inch thick, with detail made by sash manufacturer

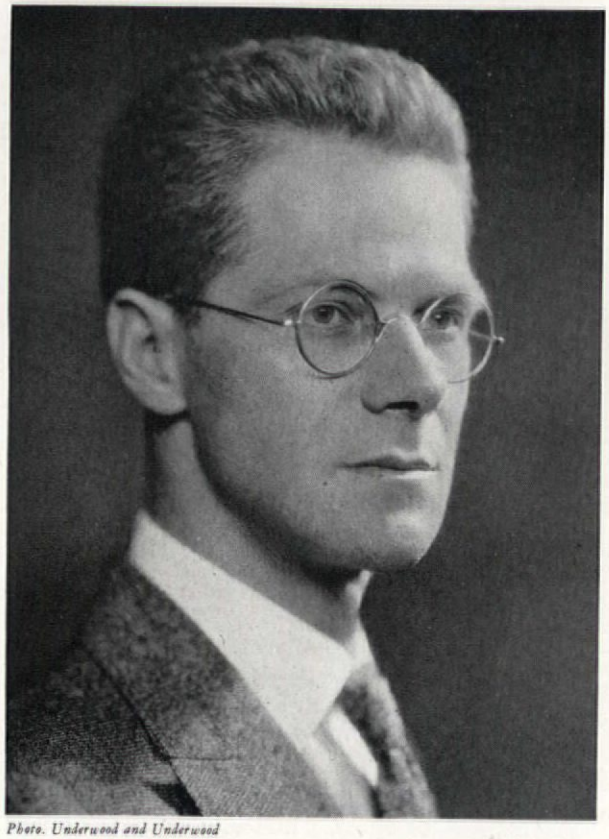


Photo. Underwood and Underwood

PLINY ROGERS

It is, perhaps, particularly fitting that I should write these few words in memory of Pliny Rogers, because he started his architectural work in our office some twenty-four years ago, when he came down from Cornell, and I think that with the exception of his immediate associates I was the last of the profession to see him.

We were building the Home Club on 44th Street in the fall of 1906 and were looking for a clerk of the works. Just how Pliny came to us I don't remember, but I do remember distinctly the very good impression he made in our first interview. He was a tall slender boy, rather reserved, with no practical experience, but very willing to try. It was a hard job for a beginner; a very complicated building, baths by the dozen, none over each other, as every floor had a different layout, and the owners had a way of going to Europe and cabling they had shifted their apartment from the fourth to the sixth floor, and they were most exacting in their demands. Pliny handled the situation well; saw to it that everything was done, and done right, and was most tactful in dealing with the clients. We have never had a better man. When the building was turned over he came in the office and I found, rather to my surprise, that he was an excellent draughtsman and had the makings of a good designer. He quickly picked up the manner of line drawing which I had learned from Bacon and Ross in the old McKim, Mead and White days, and became the best draughtsman we ever had. He left us after six years to go in with Mr. Litchfield and was for a time a member of the firm of Litchfield and Rogers, and practiced under his own name for the last four years. In partnership and alone he did much good work, a public library in St. Paul, a number of houses and apartments and an interesting development for the Government called Yorkship Village at Camden, New Jersey. His design was simple and restrained, thoroughly sound in every way; his knowledge of detail was profound, his taste uniformly good. And to the end he kept up his draughtsmanship; he made his own drawings mostly, and he took proper pleasure therein. I think, too, he had a good grasp of monumental work. I have several times urged him to go into competitions but he always seemed too busy in his other work to take the chance. If he had been stronger constitutionally I think he would have done it, and had he lived his proper span I have no doubt he would have made a great name for himself.

After he left us I saw little of him personally. Occasionally he would drop in and talk over some problem he had, or look at what we were doing. It was helpful to both of us. I only regret I did not see him oftener. He developed into a rather silent, reserved man, not assertive but fully able to hold his own with any one; not going out of his way to make friends but much esteemed by all with whom he came in contact; wrapped up in his profession and in his home; a fine man and a good architect.

EGERTON SWARTWOUT.

EDITORIALS

MAKE GRANDSTANDS SAFE

THE COLLAPSE OF GRANDSTANDS for school and college sports has been increasingly frequent since the war, according to the American Standards Association. The grandstand failures may be attributed to:

1. A desire to accommodate a large number of spectators in temporary grandstands at occasional sport events at a minimum cost.
2. Lack of regulations covering such structures.
3. The weakening of stands by repeated assembling and dismantling.

A large casualty insurance company has for ten years refused to insure grandstands of wood construction, and this naturally is the most common type of temporary stand.

In order to lessen, if not completely to eliminate, hazards to sport spectators, a national safety code is being prepared by engineers and experts in construction, under the guidance of the Standards Association. Architects concerned with athletic fields will wish to keep in touch with the recommendations of these engineers, which will be published in THE ARCHITECTURAL RECORD.

A. LAWRENCE KOCHER.

CRITICISM BY THE PUBLIC

FROM THE LAY CRITIC comes an increasing and lusty voicing of opinion on matters of design which will give, it is hoped, a healthy stimulus to the development of architecture. It is true that the more critical of the popular magazines, like the *New Republic*, the *Nation*, and the *American Mercury* with its articles by Lewis Mumford, have long been openly contemptuous of the tradition-bound products of the drafting room. The *New Yorker* has had its column by T-Square, privileged to comment on the various building activities of the metropolis. Occasionally a daily journal has been found criticizing in its editorial columns the prevailing architectural incongruities, and more recently *Life* and *Vanity Fair* have taken up the practice.

Now we find the interest of the layman extending beyond the completed building to the first published sketch. Culled from the press of the past month are two editorials, one appearing in *the new Freeman*, a liberal weekly, the other in the New York *Times*, both revealing the same skepticism.

Under the banner of "Form Follows Formula," *the new Freeman* article begins:

> On the same day last week, by a depressing coincidence, two important public building projects were announced, one to be carried out in the city of New York, the other in Washington, D. C. The designs furnished to the press establish the claim of the architects responsible for them to be congratulated upon their proficiency in archaeology. The design for New York was what Mr. Fiske Kimball might call a "superb restudy" of Kenilworth Castle. It will be a gift to the Metropolitan Museum of Art from Mr. John D. Rockefeller, Jr., and will rise above the Hudson in the superb park which Mr. Rockefeller has offered to the city. Since its purpose is to house the Museum's collection of Gothic art, a "restudy" of Kenilworth Castle will no doubt seem peculiarly appropriate to those who regard architecture as something to be borrowed from the past rather than created in the present. . . .
>
> The other design was Mr. Cass Gilbert's plan for the building which is to house the Supreme Court. It will stand opposite the Capitol, will be built in three years at a cost of $9,740,000, and is designed, we note with profound regret, to "last for all time." . . . For the Supreme Court Building he has chosen the Classic dress, Corinthian variant. There will be a middle section, with a portico at either end supported by Corinthian columns, which will quite effectually darken the interior. Flanking this will be two wings which will contain the offices of the Justices and the Court officials. The central portion of the building, which will house the Supreme Court Chamber and the main corridor, will, by a pretty conceit of the architect, "rise to a considerable height above the sections housing offices, as a means of symbolizing the relative importance of the various units." We had always thought that a work of art was in itself a symbol, and needed no associative symbolism to give it meaning. . . .

After labelling the Government buildings at Washington as being two-dimensional and dating back to the time when architects began to work from books, the article concludes:

> Mr. Gilbert's building will fit very well into this scheme of things, which is undoubtedly good enough for the Government architects, and probably good enough for the Government, but by no means good enough for America because it is not the best that American architects can do. And by the same token, neither is a restudy of Kenilworth Castle good enough—nor yet the imitation Classic design of the Memorial, lately approved, which is supposed to "embody the spirit of Theodore Roosevelt." For a country which had never produced any good buildings, an imitative, two-dimensional architecture might be condoned as better than nothing; but America is the country of the modern skyscraper. . . . of the modern factory-building, functional in design, austere and economical in detail; of the great elevators and other fine utilitarian structures which inspire admiration in foreign architects—who do not, by the way, visit this country to study the works of our archaeological school of architects, because they have plenty of these at home. . . . We regard it, therefore, as nothing short of a scandal and a national disgrace that important public buildings such as those we have mentioned are almost invariably turned over to architects whose originality is limited to choosing which of many antique models they shall copy, and whose relation to the present consists solely in the fact that they happen to live in it.

The *Times* editorial bears the caption of "Enduring Architecture" and also considers Mr. Gilbert's scheme for the Supreme Court building. Criticism of the design is by implication only; the discussion concerns the intended permanence of the structure:

> Not cheap ideals, then, but a definite philosophy, whether definitely realized or not, is behind the modern refusal to build for all time. . . . To raise buildings for all time is to impose ourselves on the future. It denies our posterity the right to express themselves in their own buildings in their own way. It fails to take cognizance of the speed of modern civilization, which in another fifty years may find skyscrapers for business offices giving way to the superior advantages of subterranean galleries electrically lighted and warmed by the new "fever tube."

Such a vigorous discussion of new buildings is to be welcomed. Far better for the architect and his building that the public should participate in its creation than that people should pass by, sublimely unconscious of defects and merits alike. In Europe controversies over projected buildings are quite customary not only among architects but also in the editorials and *vox populi* columns of the daily press. Ragnar Ostberg tells of the various attempts he made to design the tower for the Town Hall in Stockholm: several comparative solutions were evolved and published in the newspapers, and from the comments that followed the favorite was selected, revised and constructed in its final admirable form. More recently there has raged in the same city a schism between those who praise and those who dislike the functionally expressed buildings for the Swedish Exposition of 1930, designed by *Arkitekt* E. G. Asplund. Likewise in Holland and Germany one finds a keen public concern in what is happening architecturally. In these countries this popular interest is stimulated largely by the practice of the newspapers in employing professional critics to write frequent articles about new buildings in the same spirit in which the theatre critic reviews a new play.

Popular criticism of buildings is evidence of a growing demand for better structures. After all, since buildings are generally required to meet specific demands, it is for the architect to provide a solution that will satisfy these requirements. If he succeeds, the public which will use his building is best qualified to approve. If he fails and merely expresses his "soul" or "civilization" or any other convenient alibi, then also is it the public's privilege to condemn.

C. Theodore Larson.



TECHNICAL NEWS AND RESEARCH

THE PROBLEM OF MAKING BRICK WALLS WATERTIGHT
Pages 77-86

THEATRE ACOUSTICS, VENTILATING AND LIGHTING
Pages 87-96-101

NEXT MONTH:
WEEK-END HOUSES

THE PROBLEM OF MAKING BRICK WALLS WATERTIGHT

BY STANLEY NEWMAN

*"One of the most important problems facing the building industry of today is probably that of leaking brick walls. The recent expenditure of over one hundred thousand dollars in trying to make a single building in New York City tight against rain gives some indication of the seriousness of the situation."**

POROSITY OF THE UNIT

The common conception is that the units composing a leaky wall are so porous that water passes through them. It is probable that less than five per cent of the trouble is from this source. Leaks are caused by a lack of continuity in the exposed surface or skin of the building. Water penetrates to the inside of the wall through cracks and holes and not through pores. If the problem were one of porosity, it would be a simple matter to seal the pores with a waterproof treatment. In our twelve years of experience we have never attempted to stop the entrance of water by the use of any such treatment alone. Pores can be waterproofed, but not holes or cracks.

The internal ventilation or "breathing" of a masonry wall not only assists in the process of drying after partial saturation, but increases its life, and it is therefore important that the units be of sufficient porosity to permit the air, under normal conditions, to take care of the moisture in the wall. Other things being equal, walls of medium porosity withstand the elements for a longer period than those of very low porosity, as a dense masonry dries more slowly. It is also well to remember that masonry units taking up moisture rapidly give it off rapidly; units absorbing moisture slowly give it off slowly. A dense wall is more affected by frost when subject to a sudden drop in temperature, as it contains more water in proportion to the porosity.

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WORKMANSHIP

Good workmanship involves a thorough filling of all bed and end joints with sufficient mortar and the proper placing of the masonry units. These are the chief duties of the bricklayer. Yet where workmanship has been the cause of leaking walls, it has been due in most cases to lack of sufficient mortar in the end joints. The bed joints are usually fairly well filled, as it would otherwise be difficult to lay a stable and presentable wall. Since the joints constitute the most vulnerable portion of the surface, it must be borne in mind that a perfect bond between the brick and the mortar is most essential.

For all exposed walls subjected to wind-driven rain, the outside courses should be laid with shoved joints formed with a bed of mortar, a little thicker than the finished joint, by pressing the brick, or other unit, downward and sideways with sufficient strength to force the mortar into the end joints. Furthermore, additional mortar should be placed in the upper part of the end joint, and sufficient pressure exerted to force it out the full depth of the joint. In the backing, whether of brick or tile, a partial separation, or break in continuity, creating air spaces, is considered to make the wall more weather-resisting; it will dry out more quickly and is amply strong for ordinary loads. Porous back-up units reduce the chances of water reaching the inside of the building.

The real resistance of any wall, however, is found in the exterior course of masonry, and if the joints are all well filled—both bed and vertical joints—and a proper adhesion obtained between the mortar and the contiguous units, there need be no fear of leaks. It is very difficult to get masons to lay shoved joints, for a man's hand will be raw and tender if he is forced to shove all joints the entire day. Consequently, by eliminating this requirement in the back-up courses, there is a better assurance that the mason will shove all the joints in the veneer or exterior course. Neither is there any reason to believe that this practice will reduce the resistance of the wall.

The general specification that all masonry units should be wet before laying, except in freezing weather, is an essential requirement, provided that it is not indiscriminately applied to units that are dense and impervious. The hotter and drier the weather, the more water should be used. If porous materials are not wet, they absorb the moisture from the mortar, leaving an insufficient quantity for the proper hydration of the cement and lessening or destroying the bond between the mortar and the unit.

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*Statement of F. O. Anderegg, conducting an investigation for the Eastern Face Brick Manufacturers' Association in cooperation with the Portland Cement Industrial Fellowship of Mellon Institute to determine the causes of, cures for, and prevention of leaky brick walls. *Journal of the American Ceramic Society*, Columbus, Ohio, May, 1930, page 315.

Many leaks are traceable to this source, and there is very little danger from porous brick being laid too wet, but as the wetting of the brick takes labor and makes it harder on the hands of the mason, wetting is often neglected, unless insisted upon by the builder. On the other hand, the units should not be soaked to the extent that they slide on the mortar bed, or carry an excess of surface water which will thin the mortar so that it may run down the face of the wall. Over-wetting also eliminates the proper suction necessary to draw the mortar into the pores of the brick and diminishes the bond between the mortar and the masonry; there is also danger that soluble salts in the brick may be dissolved and later brought to the surface where subsequent evaporation will cause efflorescence. A brick of low porosity should be immersed in water and immediately removed.

In cold weather the rate of absorption is lowered, and it is desirable to use a brick or other units of higher "sucking power." The width of joint should also be considered; a more porous brick being preferable when a wide joint is desired. Thin joints of one-quarter inch or less, when the work is done in hot dry weather, require a unit having an absorption rate of from one to four per cent in two minutes of immersion. In cold damp weather these values might well be doubled. For thick joints this rate should be doubled for summer work and quadrupled for winter work. The above recommendations are based upon the work of F. O. Anderegg at Mellon Institute, University of Pittsburgh, who was assisted by skilled mechanics. These results have also been checked by careful observation on a number of jobs.

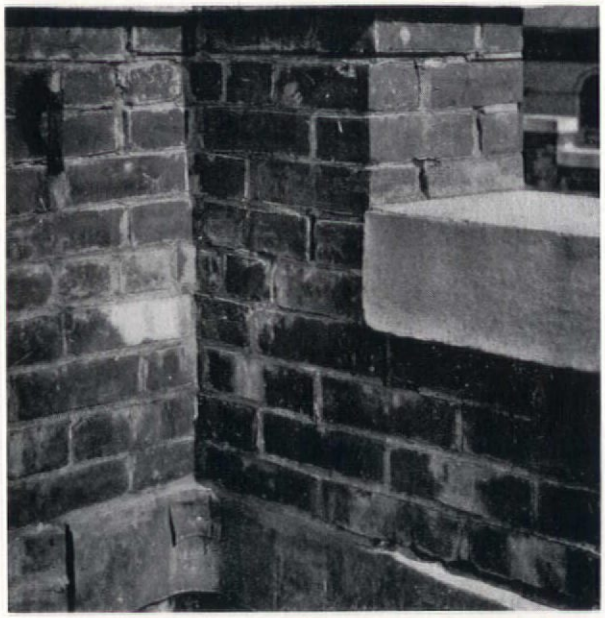
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THE MORTAR JOINT

As the total joints in brickwork constitute approximately one-seventh of the wall volume, it is evident that the type of joint plays an important part in the elimination of leaks in masonry. There are many cases on record where every detail was correctly specified and executed with the exception of the manner in which the joints were constructed, and this one feature caused leaking of the wall.

Cut-flush and raked joints, while they may improve the appearance of a wall surface by adding color and texture, are so difficult to properly construct that we recommend their elimination for buildings accessible to wind-driven rain. It has been our experience that in forming cut-flush and raked joints the tendency is to open up the body of the mortar and to draw the mortar away from the units.

The joints that afford the best protection are those of the weathered and concave type. These not only present an excellent surface for the shedding of water, but require for their formation an amount of pressure sufficient to compress the mortar and create a firm bond between the mortar and the brick at the face of the wall, thereby reducing the probability of hidden cavities.



Cracks in Parapet Caused by Improper Mortar and Insecure Bonding of Brick and Mortar

The size of the joint also is an important factor; wide joints cause considerably more trouble than narrow joints, due to the sagging of the mortar.

Many architects, for the sake of appearance, specify a mortar joint with a thickness of one-half or three-quarters of an inch; the latter has just three times as much shrinkage as one a quarter of an inch thick. Another disadvantage of a wide joint is that it is necessary to use a very dry mix, as the least amount of excess water causes a "bleeding" of the mortar. On the other hand, too dry a mix lacks sufficient moisture to hydrate the cement.

Other things being equal, the thinner the mortar joint, the stronger the masonry and the greater the resistance to the infiltration of water. Of course there is a limit to the thinness of the joint, but as long as there is sufficient mortar between the brick to fill all cavities and to bond the units, the purpose of the mortar is accomplished.

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THE MORTAR

Next in importance to the quality of the units that make up a masonry wall is the character of the mortar, or cementitious materials, which serve to bind these units together. The first masonry walls were brought together and properly placed without the use of a binder or mortar. One of the first binding materials to be used was lime. Today the practice on most operations is to use hydrated lime; this material has the advantage over quicklime that it

does not require slaking before being mixed with the cement and sand. The choice between the two types of lime is a matter of cost as excellent work can be done with either. In general it is a good plan to use a higher proportion of lime when laying brick having a comparatively high absorption. Every mason realizes however that the proper amount of lime added to Portland cement mortar increases its workability and causes the mortar to spread more readily.

It is doubtful if mortar is ever mixed for too long a period. On most operations a careful inspection will disclose a lack of homogeneity in the mixture. This condition can be so easily controlled and is so detrimental to the work that it would seem to be inexcusable. If masons could be made to realize the advantages in workability and future imperviousness to be gained by thorough mixing, there would be much less leakage through masonry joints. The present practice is to mix from one to two minutes. The latter should be an absolute minimum and some day it will be realized that the mixing period might be considerably extended. In fact we are told that some engineers recommend that the mortar be mixed for at least one and one-half hours.

Experience would indicate that most leaks are due to lack of resistance in the mortar joint. The following properties are necessary to insure proper resistance, assuming that the workmanship is good:

1. Plasticity—the quality of workability under the trowel.
2. Impermeability—the mortar must be of a suitable structure, when hardened, to resist the passage of water.
3. Adhesion—the ability to bond properly to the units.
4. Elasticity—the ability to resist stresses due to temperature, slight settlement and wind, without appreciable cracking.
5. Minimum shrinkage in the final setting of the mortar.

Besides the amount of water used in the mix the three chief factors determining the character of the mortar are: the cementing material, the aggregate, and the ratio between the two. The thoroughness of mixing is also important.

The ideal mortar should have both cohesive strength and bonding quality. Mortars containing a relatively large amount of cement suffer greater volumetric changes during hardening than the weaker mixtures. Wet mixtures suffer greater changes than those of drier consistency. In other words, mortar containing an excessive amount of cement or water, or both, shows a proportionately greater amount of shrinkage which tends to destroy the bond between the mortar and the masonry units.

The Portland Cement Association formerly made the following recommendations: "A proportion of one sack of cement to two cubic feet of sand will be found satisfactory under most conditions. A mixture containing in excess of three cubic feet of sand for each sack of cement is not recommended. Hydrated or slaked lime may be added to the mortar in an amount not exceeding 25 per cent by volume of the amount of cement in the mixture."

The new recommendations of the Portland Cement Association reduce the amount of cement and increase the amount of lime, and in a recent letter from the Association one part cement, one part lime and six parts of properly graded sand are now recommended.

Approximately these proportions have been successfully used by the foremost builders of industrial chimneys constructed of radial brick; the resulting mixture has a satisfactory plasticity and bonds well with the units.

It is interesting to note that cement mortar of average consistency has a much greater expansion than that of ordinary brick. A rich mortar of high cement content will give a greater initial shrinkage and less adhesion than one containing a lower amount of cement. It is the practice of many architects and engineers to specify a mortar of one part cement and three parts of sand with approximately ten to twenty-five per cent of hydrated lime.

With the greatly increased use of Portland cement during the last twenty-five years, there has been a radical change in mortar mixtures from lime mortar to cement-lime mortar; fire resistant buildings with bearing walls required mortar of sufficient strength to carry the superimposed weights; rich mixtures were used. Today most fire resistant construction is supported by structural steel frames, and it is not necessary to use such a high proportion of cement in the mortar.

J. W. McBurney in "The Effect of Strength of Brick on Compressive Strength of Brick Masonry," Proceedings of the American Society for Testing Materials, Vol. 28, page 605, states:

"Except where lime mortar was used, the typical failure of brick masonry at maximum load was by crushing of brick. Mortar 1: 1: 6 (one part Portland cement, to one part lime, to six parts sand) or stronger, was apparently uninjured."

According to this statement, it would seem that except for bearing walls the general practice is to use a larger proportion of cement than required for the purpose of strength. It should be remembered however that where bearing capacity is required, it is desirable to use a mortar of comparatively high Portland cement content, as the strength of masonry is closely associated with the strength of the mortar comprising the joints regardless of whether the mortar or the brick is stronger.

SAND

The old standard specification that the sand shall be sharp and clean should be changed to require a clean, well-graded sand with particles ranging from fine to coarse. The use of very fine sands should be discouraged and the size of the coarser particles should be as great as the width of joint permits.

The inspection of a leaking building, made several weeks ago, showed that a poor sand was the primary cause of the trouble. The material was too fine and contained a high percentage of loam, resulting in a weak and porous mortar. The porosity of the masonry units provided sufficient suction of the mortar and the proportion of sand to cement appeared satisfactory, but the mortar was so soft that it could be dug away with the fingernails. In this particular building the water was penetrating through the entire mortar joint and not confining its entrance to any shrinkage cracks between the mortar and the brick. The workmanship was of average quality and we feel that the whole trouble in this case was due to the sand. Even if money was saved by the purchase of this material, it was offset in labor, as the substitution of a cleaner, coarser and better graded sand would have reduced the cost involved in placing the mortar and made subsequent repairs unnecessary.

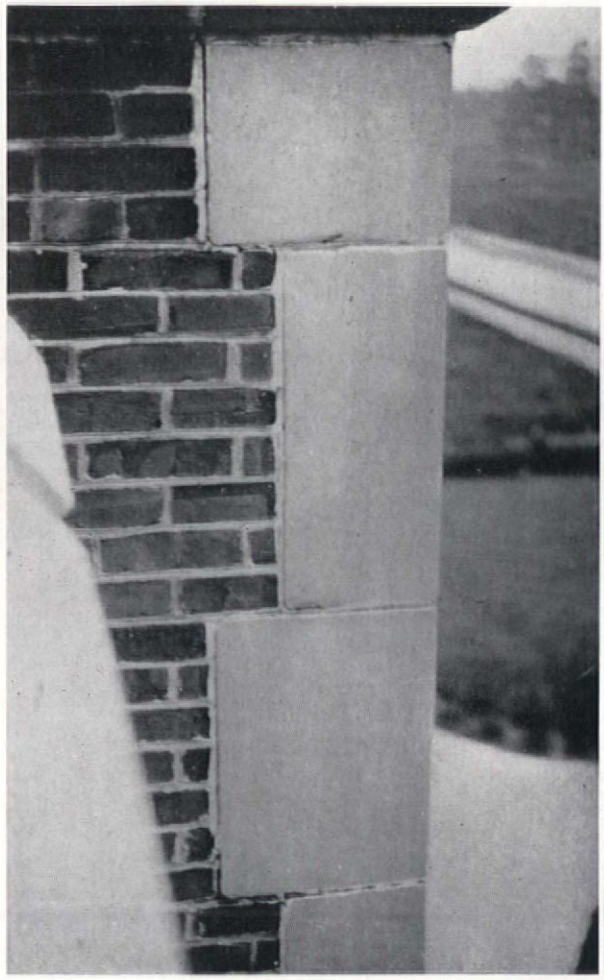
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FLASHING

Although the value of proper flashing can hardly be over-estimated, there is undoubtedly a tendency to substitute flashing for good construction. It would even seem as though some engineers and architects believed that sufficient flashing would eliminate all leaks and act as insurance against poor workmanship. In this connection it is worthy of note that in our entire experience we have never found that the flashing was the sole cause of trouble on even a single building.

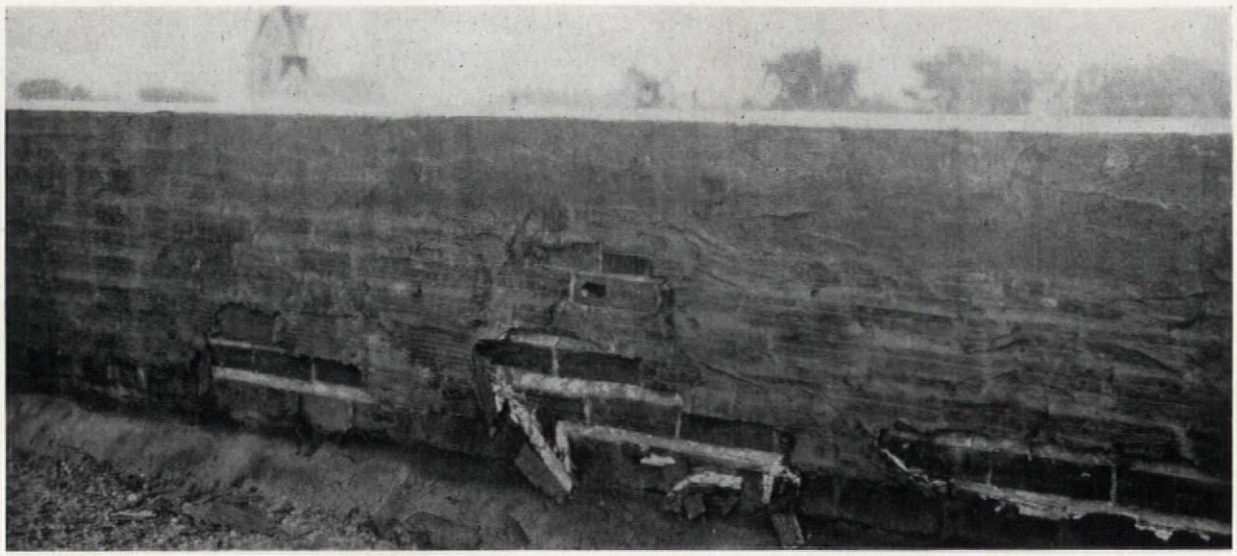
On parapet wall construction we recommend a through flashing above the roof level that will take care of the entrance of water from either side of the parapet, carrying the water out onto the roof or down the face of the wall. If there is a cornice at the roof level, we recommend that the flashing also extend over the entire top of the cornice, all flat surfaces being either covered with flashing or flashed under, as such may not shed water with sufficient rapidity to prevent infiltration. Surfaces subject to any appreciable volume of water accumulating on roofs or decks should be metal covered. A base flashing of sufficient height above the roof is of course necessary to take care of water that accumulates on the roof.

Flashing on the back of the parapet, commonly known as sheathing, should not be used. If it were necessary to cover the back of the parapet, it would be equally necessary to cover the front. If we assume that the masonry will leak, covering the back of the parapet cares for only one-half of the surface through which water may be expected to penetrate. Furthermore the practice is actually harmful as the flashing material interferes with the ventilation of the parapet wall, and should a falling temperature occur after a driving rain, bringing the wall to a freezing point, it is probable that an accumulation of supersaturated masonry will freeze on the side that is covered by the flashing, causing a crumbling and disintegration of the surface. We have seen parapets where the brick had been covered with black asphalt and after a short length of time there was a considerable amount of spalling and breaking away of the brick from the wall. This was due to the fact that imperfect ventilation prevented the



Courtesy of Common Brick Association of New York and New Jersey

Leaks due to unequal expansion of stone and brick. Joint between brick and stone should be raked out ½″ to 1″ deep and filled with an elastic caulking compound



General Building Contractor

Disintegration caused by membrane waterproofing inside parapet wall which prevented "wall breathing"

water from being driven out of the side which had been covered with asphalt and subsequent freezing caused disintegration of the masonry. This same condition also occurs under copper flashing, but it is not usually observed because the copper hides the masonry. It is recommended that the inside of parapet walls be left uncovered and that a through flashing be placed at the roof level. We have seen cases where the back of the parapet is not covered with copper and where the frost had caused the brick to crack and spall, but in these cases the bricks were underburned and were not of good quality. Good bricks do not spall.

On an open parapet where a capping of stone is used, it is well to flash through under the stone in addition to through flashing above the roof material. This through flashing under the stone takes care of the water which flat surfaces retain. We should also recommend copper flashing under sills that are made of brick or very porous cast-stone, but if the sills are of granite with no dividing joints throughout their entire length, flashing is not necessary. This practice applies to any stone with a small amount of absorption and where there are no joints.

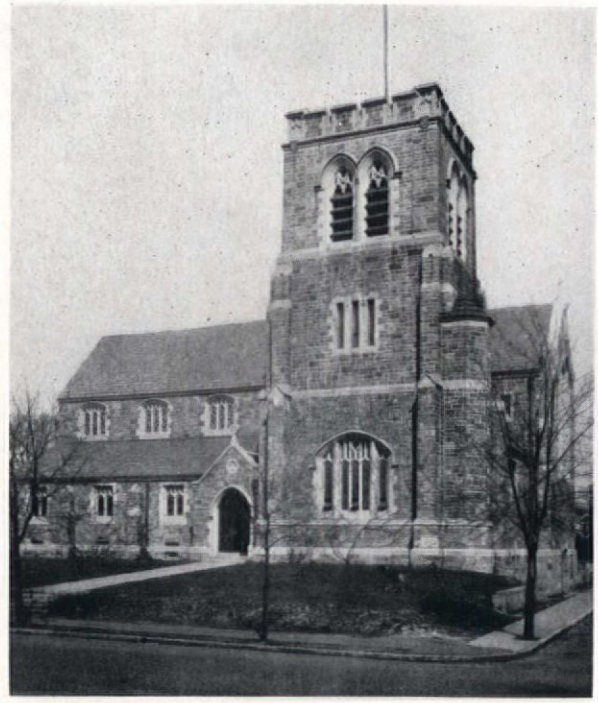
It should be realized that after through flashing is placed in a wall, the space immediately above the flashing is filled with masonry units and mortar, and it takes only a small amount of water to flood up to and overflow the turned up edges of the flashing. During a continuous; driving rain the water enters the wall through the many cracks and holes of the masonry joints above the flashing, and as these joints may number several thousand, it would be a physical impossibility for one bed joint above the flashing to carry off the water that is entering from the many joints above it. A driving rain has a wind pressure back of it which actually holds the wind against the side of the wall. A fifty-mile wind-driven rain develops a pressure equal to three inches of water.

Some persons believe that weepholes in addition to through flashing will solve the problem. These may help slightly, but the pressure of the wind during a driving rain may temporarily prevent the water from leaving the weepholes.

Let us consider two typical cases taken from our experience. Building No. 1 is situated on the Atlantic Ocean and built of fieldstone with two large chimneys extending well above the roof. The walls had leaked from the time the building was erected and three different attempts had been made to stop the leaks before our advice was requested. At the time we were called in the owner was considering a suggestion to take down the two chimneys to the roof level and flash through the masonry, carrying the flashing up several inches on the inside flue lining. This would have cost several thousand dollars besides an additional outlay for treatment of the main walls. The probable result would have been to eliminate leakage during a mild rainstorm up to the point where the copper would have overflowed. In a driving rainstorm of considerable length the water would have been concentrated at a single section, and after the saturation of the masonry had risen above the protective dam formed by the flashing, the owner would have discovered a leak he had never seen before. As a matter of fact, the chimneys were made raintight by attending to the joints and no additional flashing or hoods were necessary.

Building No. 2 is a church tower constructed of seam-faced granite. The top of the tower was de-

signed with a parapet, the back of which was covered with copper. The large and massive capstone was only partly flashed and the copper flashing was carried several inches under the stone on the roof side. This tower leaked from the time it was erected; the roofer was blamed for the trouble and payment withheld. He ran a number of tests by flooding the roof with water to a depth of several inches, but no leaks appeared. The next step was to take off the massive capstone as the owner felt that the leaks were due to water coming down through the stone. A copper flashing was then carried through under the stone; this should have been done when the building was erected. As the leaks still appeared after prolonged rains, the owner realized that the water came in through the exterior masonry. Many methods were suggested for stopping the leaks and over a period of five years three attempts were made to make these walls tight. With one attempt the owner received a guarantee, but the unfortunate part of a guarantee is that it does not offer a solution to any problem. After all of these worries and expenses the owner finally learned that the real cause of this trouble lay in the lack of a bond between the stone and mortar. Remedial treatment was confined to the joints which were cut out and repointed with the proper mortar to provide perfect adhesion to the stone units. The church is now as dry as could be desired.



General Building Contractor

St. Martin's Episcopal Church, Providence, R. I. Numerous experiments failed to make this building dry until the mortar joints were cleaned and repointed with the proper mortar

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CONDENSATION

If plaster is applied directly to exterior walls of solid masonry built without air space or other insulation, condensation is likely to cause a film of water to appear on the inside surfaces. In some cases this causes the paint to "burn," blister, or saponify. Sometimes it is difficult to determine whether the burning of the plaster is due to condensation or to the infiltration of water from the exterior of the building. If the condensation follows a period of driving rains, the burning of the plaster may be due to either or both causes. This can sometimes be determined by examining the condition of the plaster in the areas which show burning. If the plaster back of the paint is not thoroughly saturated with water, it is a case of condensation, but if the plaster is wet, it could be either condensation or leaking masonry.

The fact that condensation causes a burning of the plaster is due to the priming coat having been applied to too damp a plaster or to the use of an oil in the priming coat that is susceptible to the action of the free alkali in the plaster. It is also possible that even though the priming coat be properly applied and unaffected by the free alkali, the finish coat may be of such inferior grade that the water of condensation will penetrate and cause a deterioration of the priming coat as well as of the plaster, and the absorption of moisture by the lime will bring about a chemical reaction forming a bloom or whiskers of calcium salts on the surface. As this salt is often hydroscopic, it may attract moisture even when the paint film in other areas is not affected.

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FURRING

The inside of exterior masonry walls should be furred, except in climates where such has proven unnecessary or in locations where there is sufficient protection from wind-driven rains.

Although there are many cases of raintight walls which have been plastered directly to the interior of the masonry surface, the chances are that a furred wall will not leak so readily as one that has no air space between the brickwork and the plaster. Furring may be of wood, hollow tile, or metal, depending upon the type of construction and the local building ordinance.

In order to obtain air space in the body of the masonry, some specify hollow brick walls in which the face and the back-up brick are separated by a two-inch space and bonded together and metal ties laid in the mortar joints at proper intervals. The Rolok type of hollow wall in which the bricks are laid on edge and an air space left through the center has also been successfully used on numerous

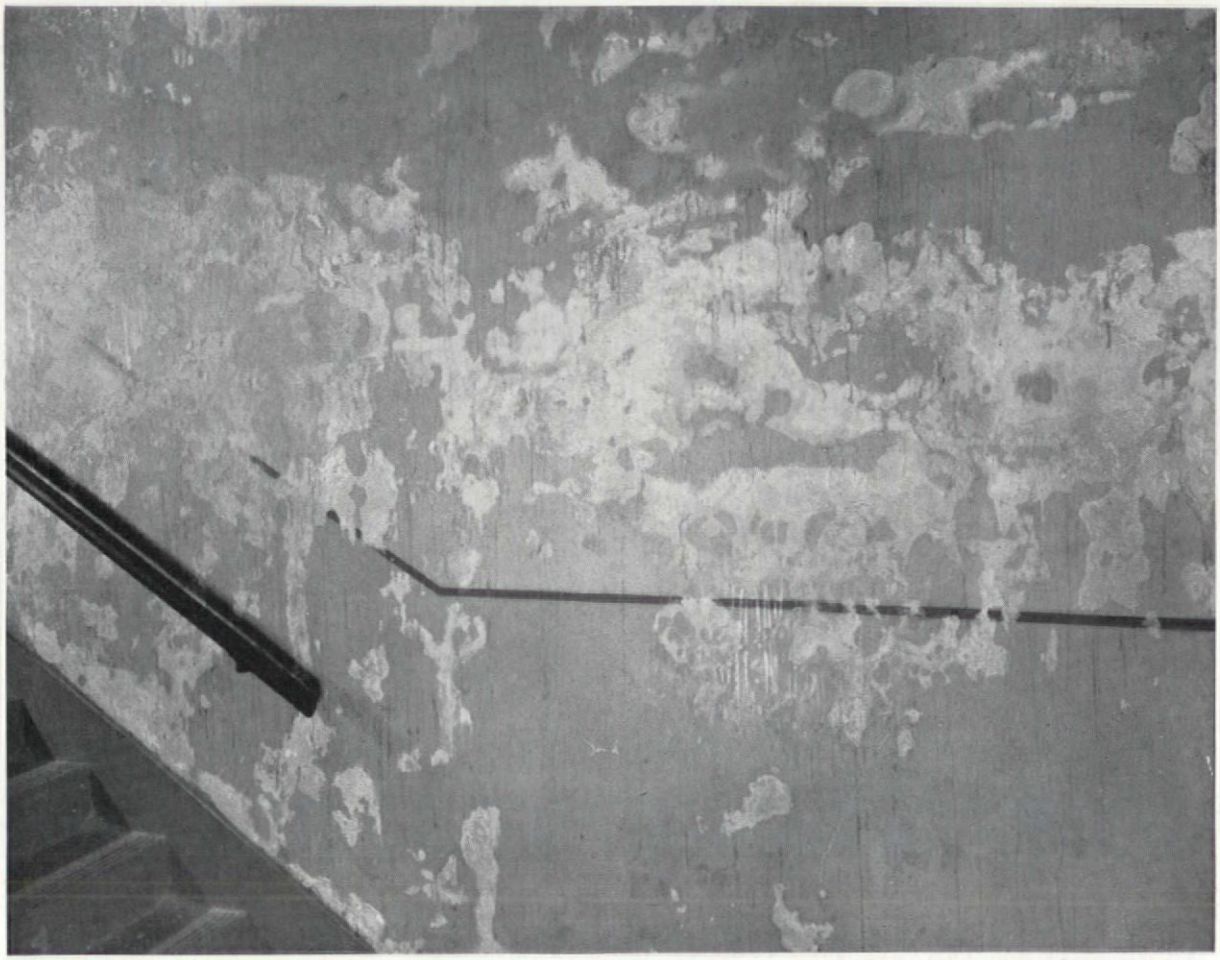


Photo. Dimit Brothers

Typical failure of plaster due to leaking wall, condensation or both. Better workmanship, membrane waterproofing and furring would help

operations. Many consider that walls of this type offer better insulation against cold and dampness, and they are used for the purpose of eliminating the furring, particularly for small residences. Experience however proves that the air space is apt to become filled with mortar and brick chips during construction, and that furring is a good insurance against condensation and leaks even when the wall is supposed to be hollow. When furring tile is used, care should be taken to avoid filling the space between the tile and brick with mortar as such would naturally lessen the insulating value of the construction. In many localities hollow tile back-up units have become the general practice for exterior masonry walls and give excellent results. An ordinary three-inch partition block also makes a satisfactory furring.

In locations subject to wind-driven rains, we should recommend that the inner surface of brick walls be damp-proofed before the furring tile is plastered. Damp-proofing however is of very little value unless the mortar joints have been properly pointed with a suitable mortar.

Although the Portland Cement Association has laid down a conservative policy in regard to furring walls built of hollow concrete units, it is regrettable that contractors take the chance of plastering directly on the inside of the block. As in the case of tile walls built of a single thickness of hollow tile, there are many cases where plastering directly has been successful, but this is not considered to be good practice.

A recent report submitted to the President of the Board of Education, New York City, contains the following statement: "It is of great importance that walls should be well built in the first place with good bricks and solid joints. A well-laid solid brick 12-inch wall damp-proofed inside, as an additional precaution against leakage, and then furred with hollow tile to prevent condensation, is most dependable."

ITEMS IN SPECIFICATIONS TO PREVENT LEAKS †

Bricks

This specification is applicable to common, solid or hollow (not face) clay brick of any of the following four classes:

V—Vitrified
H—Hard
M—Medium
S—Soft

Material and Workmanship. Brick under this specification shall be of clay or shale, be sound, of compact structure, reasonably uniform in shape, free from stones and pebbles that would affect their serviceability or strength, and without excessive laminations or warpings.

General Requirements. The standard size of brick shall be 2¼″ x 3¾″ x 8″, with permissible variations of ⅛″ in breadth or depth and ¼″ in length.

Bricks shall be delivered in good condition, with not more than 5 per cent broken.

At the completion of the absorption test the bricks shall show no evidence of disintegration.

Detail Requirements. The brick shall meet the following absorption and strength requirements for its respective class. The standing of any set of bricks shall be determined by the requirements in which it is lowest. Unless otherwise specified in the invitation for bids, medium (M) or hard (H) brick shall be accepted in lieu of soft (S) brick, and hard (H) brick in lieu of medium (M) brick.

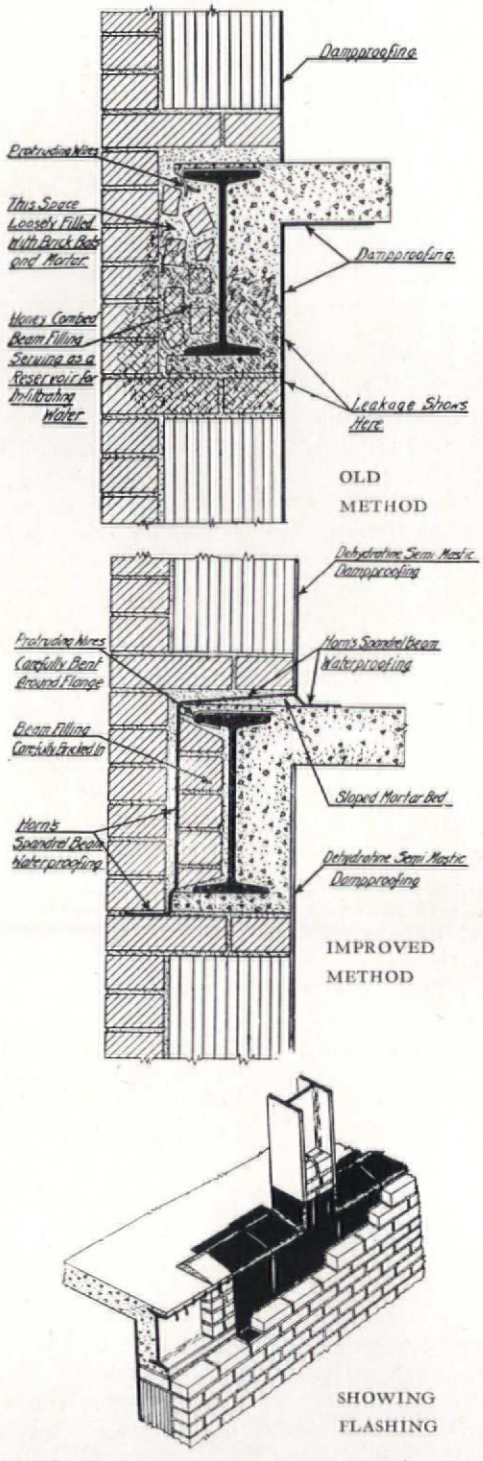
Brick should be of sufficient porosity to permit breathing or ventilation of the wall.

PHYSICAL REQUIREMENTS

Class	Absorption Per Cent*		Transverse breaking load, Pounds, 7-Inch Span	
	Average of Five	Individual Maximum	Average of Five or more	Individual Minimum
V....	5 or less	6	2170	1450
H....	5 to 12	15	1080	725
M....	12 to 24	28	810	540
S.....	24 or more	no limit	540	360

* There appears to be a widespread belief that the percentage of absorption of individual bricks is a governing factor in the ability of brick masonry to resist moisture penetration. It has been conclusively shown that such belief is erroneous. If absorption percentage has any significance, it is as a possible measure of that quality of brick masonry known as durability.

† *Brick Engineering.* Vol. I, Pages 23, 24, 80, 81.



Courtesy of A. C. Horn Company

The area in front of spandrel beam, due to wall thinness, regardless of how well brick work is done, is a source of trouble difficult to prevent except with flashing. Furring and flashing at floor levels will not prevent leaks through structural cracks caused by movements of the structural frame but will generally prevent damage from water leaking in through these cracks

MORTAR

Portland cement and non-staining cement mortar shall be composed of 1 part cement, 1 part lime, to 6 parts of sand.

The proportion of lime should be increased for brick of high absorption and decreased for brick of low absorption. Also more lime should be used in summer than in winter.

Mortar shall contain ammonium stearate paste or . . . integral waterproofing in proportions as specified by the manufacturer.

LAYING BRICKS

Details of Brick Wall Construction. The face and common brick shall be shoved with full beds of mortar. No grouting nor buttering will be allowed, but all vertical as well as horizontal joints shall be thoroughly filled with mortar.

All brick forming the 4″ veneer shall be carefully laid 1″ clear of the outside diagonal sheathing, and care must be taken not to fill any part of this space with mortar. Every third stretcher in every fifth course shall be tied to the sheathing with galvanized Morse wall ties. Ventilate and drain the air space at the bottom by using 2″ drain tile. This drain shall be carefully formed and pitched to two outlets on each of the four sides of the house.

No part of the walls shall at any time be carried more than 4′-0″ above any other portion; they shall be stepped, or provided with approved anchors for connecting the sections.*

The mortar joints shall be of the weathered or concave type.

DAMPPROOFING INSIDE OF WALL

The following walls shall be entirely covered with..... applied in exact accordance with directions furnished by the manufacturers:

All exterior walls that have plastering applied directly on masonry.

All exterior walls that have brick facing. Paint shall be applied before facings are laid.

SPANDREL WATERPROOFING †

(*a*). *Bending Wires*

(This paragraph to be inserted in fireproofing specifications.) The fireproofing contractor shall bend all wires that extend past the outside of all spandrel beams so as to fit tightly against the underside of the beam flange. These wires shall be clipped so as to approximately reach the web of the beam when bent.

(*b*). *Spandrel Beam Filling and Mortar Bed on Top of Floor Arch*

(This paragraph to be inserted in the mason specifications.) The mason contractor shall fill in the space between the web and flanges on the outside of the spandrel beams and wall columns with brickwork so as to form a solid and smooth surface for the spandrel beam waterproofing.

On top of the floor arch and at its outside edge, this contractor shall also lay a bedding of cement mortar extending back at least 8″.

This mortar bed shall be sloped upward from the edge so that its thickness at the inside wall line shall be approximately and not less than 5/8 of an inch; this bed to form a base for the spandrel beam waterproofing to be applied later.

(*c*). *Waterproofing Spandrel Beams*

The outside of all exposed beams shall be waterproofed by the application of a membrane of.....

It shall extend through the entire wall and be carried in on the rough concrete floor at least 3″ beyond the wall line so as to lap on the wall dampproofing which will be applied later.

The membrane shall be carried down the face of the beam filling for depth and then out 3″ on first course of brick below bottom of beam.

All joints shall be lapped at least 3″ and well buttered.

The membrane shall be flashed up at least 6″ at the outside and two adjacent sides of all wall columns and on all faces of corner columns.

The membrane shall be applied in units approximately 3′ wide and of sufficient length to conform to the construction detail as specified above.

After the columns have been flashed as above described, the flashing around the corners shall receive a reinforcing strip of the waterproofing which shall be applied to the outside corners extending for the full height of the flashing and at least 3″ on each face of the column.

The membrane shall be pressed tightly against the underlying surface so there shall be no wrinkles.

This contractor shall co-operate with the mason contractor in order to properly schedule his work and avoid delays. All brick work, bending of wires, and application of mortar bed on top of the floor arch shall be done by others.

(*d*). *Dampproofing Solid Brick Walls*

The inside surfaces of all solid brick exterior walls, from ground floor level to pent house roof, shall be given a standard trowel coating of..... applied in strict accordance with the manufacturer's specifications.

(*e*). *Dampproofing of Hollow Back-up Tile*

The inside surfaces of all exterior walls having hollow tile backing from ground floor level to pent house roof shall be given one heavy, thoroughly covering coat of..... waterproofing.

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* Due to the manner of operating brick gangs skilled corner men frequently lay up brick ahead of the side men, with the result that the corner work is left toothed, making it difficult to properly mortar the adjoining brick work when laid. Many major leaks occur in such locations.

† Horn's Specifications for Waterproofing Spandrel Beams. A. C. Horn Company, Long Island City, N. Y.

THEATRE ACOUSTICS, VENTILATING AND LIGHTING

ACOUSTICS*

Obtaining good acoustics is not just a problem of putting sufficient sound absorptive material into a theatre. **It is entirely possible to get too much sound absorption or to place it in the wrong location.**

Acoustics is such a complex science that it is impossible to give an empirical method by which the architect may assure a theatre having good acoustics. However, a few general rules and cautions may be given.

SHAPE AND SIZE OF AUDITORIUM

1. SHAPE

Experience shows that theatres varying from a floor plan approximately square to a floor plan having a depth one and one-half times as great as the width give equally satisfactory results when other conditions are equally satisfactory. No definite limits may be set, although it is obvious that this ratio must not be extended too greatly.

2. SIZE

The ratio of height to width and length is largely a problem to be determined as a factor controlling the volume. **If original speech is a controlling factor in the acoustic design, the volume should be as small as other conditions permit, but not less than an amount such that the total absorption offered by the audience together with the absorption of the construction surfaces, carpets, drapes and other absorbing materials, will indicate a time of reverberation less than the selected optimum for an auditorium of this size.** (See graph page 91.) All volume added to the theatre over and above that just required to meet the above condition must be compensated for at a rate of approximately four units of absorption for each one hundred cubic feet of volume.

In the design of theatres for talking pictures, the limitation imposed by loudness is not nearly as severe, since within proper limits additional energy may be employed at the source, over that normally produced by a speaker. The employment of sound projectors having directional characteristics may further improve the relative distribution of sound in a large auditorium. However, the ability to increase the energy for the sake of obtaining added loudness carries with it the penalty of increased duration of sound due to reverberation; and the concentrated energy employed to improve distribution may give rise to acoustic difficulties in improperly designed auditoria that might be tolerated with normal energy input. Under certain conditions, however, theatres that would be defective for original speech may be made reasonably satisfactory for reproduced speech by proper employment of sound projectors.

3. CURVATURE

Curved walls or ceilings should be avoided.

A curved surface acts somewhat like a curved mirror back of a source of light. It produces convergent, parallel or divergent sound rays depending on relation of the source to the centre of curvature of the surface. This in itself is a sufficient source of acoustical difficulty and when it is considered that the auditorium is bounded on all sides by other surfaces either plane or curved, which may act as reflectors to the beam reflected from the first surface, it is possible to have a number of sound foci, resulting in echoes and points of interference scattered at various points throughout the auditorium. (See Fig. 1.)

The "atmospheric" theatre is an exaggerated case of faulty acoustic design from this standpoint. Cycloramas of any curvature, especially when made of hard plaster, are to be avoided at all costs. The plaster cyclorama should have a plane surface except that a curve of short radius at both ends and top may be permitted.

> Mr. Clifford Swan, consulting engineer on acoustics states:
>
> "Many architects still cling to the idea of vaulted or domed auditorium ceilings and curved rear walls, but *curved surfaces* are always a potential source of acoustical difficulty. It is sometimes possible to introduce such surfaces without injury to the acoustics but they should be considered only after a careful scientific analysis of the problem."

4. REVERBERATION

Wallace C. Sabine presented for the first time a practical method for forecasting, within limits, the acoustic condition of auditoria by stating a simple formula involving a mathematical relationship between the volume and the total amount of sound absorbing material present. This relation is such as to constitute a measure of the "Time of Reverberation," or the time required for a sound of certain

*By G. T. Stanton, Assistant Acoustical Engineer, Electrical Research Products, Inc.

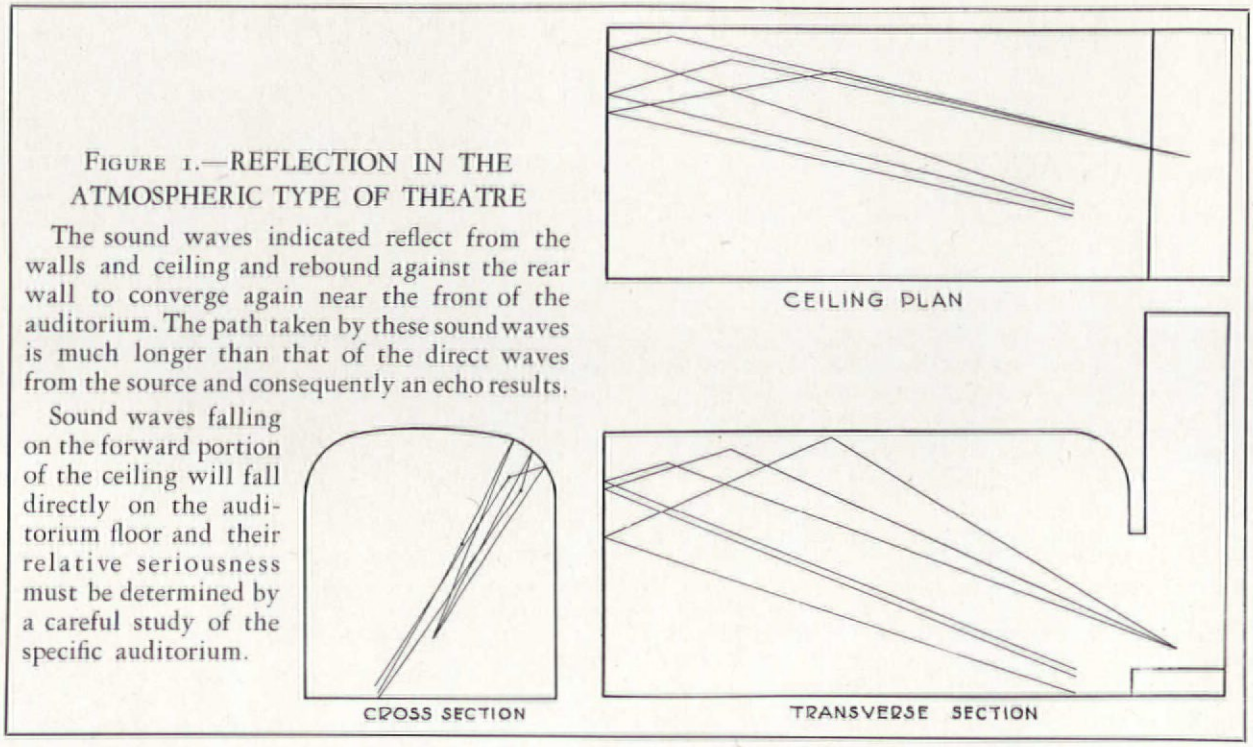


FIGURE 1.—REFLECTION IN THE ATMOSPHERIC TYPE OF THEATRE

The sound waves indicated reflect from the walls and ceiling and rebound against the rear wall to converge again near the front of the auditorium. The path taken by these sound waves is much longer than that of the direct waves from the source and consequently an echo results.

Sound waves falling on the forward portion of the ceiling will fall directly on the auditorium floor and their relative seriousness must be determined by a careful study of the specific auditorium.

specified magnitude to decrease in intensity until it can no longer be heard. The accuracy with which Professor Sabine's formula forecasts this factor reflects the painstaking nature of his work. However, the application of this factor presupposes certain conditions which may not obtain under the actual theatre conditions:

(a) The sound in question must persist for a period of time so that the intensity of sound is uniform throughout the auditorium.
(b) Sound must propagate equally in all directions.
(c) The material capable of sound absorption must be distributed with reasonable uniformity about the auditorium.
(d) The absorption must be in sufficiently small quantities to insure a moderately long time of reverberation. An improved formula has been offered in the past year by Dr. Carl F. Eyring which removes the latter limitation.

In addition it is essential to take into consideration the effects of changes in loudness, interference from extraneous sounds, echoes, and the effects of variations in the size of the audience.

RECENT DEVELOPMENTS

The modern approach to the science of acoustics is from the standpoint of what the ear must hear to be satisfied, and what must be done in the auditorium to obtain the conditions required.

The auditorium is considered to be a system for transmission of sound. The requirements of sound transmission in terms of auditorium acoustics are:

1. That a satisfactory loudness be maintained.
2. That there be no interfering noise introduced.
3. That the sound be unchanged or undistorted.

1. LOUDNESS

Loudness of speech is decreased as the size of the auditorium is increased, and as the amount of absorption is increased. These factors must be kept within limits that are determined by the loudness considered necessary in the most remote seats and are dependent upon the energy in the source of sound. The shape of the auditorium is also a factor since the energy reflected from the surfaces tends to increase the loudness in the auditorium.

2. NOISE

Interfering noise has two effects on hearing sound. One is the psychological factor of disturbance or annoyance which distracts the attention of the listener. The other is the physiological effect upon the ear which temporarily deafens more or less the auditor.

This latter effect is generally referred to as "masking," and in the presence of noise a greater degree of loudness of the original sound is required for equal articulation or ability to understand. The ability to understand begins to fall off as the loudness of the sound increases above a limiting level. **Noise therefore must be kept to such low levels as to not require an undue increase in loudness for good hearing.** In large auditoria the loudness, particularly for original speech, is generally the limiting factor in the permissible size of the auditorium, and any sacrifice in the effective loudness necessitated by

undue noise further restricts the permissible size of the auditorium.

PRINCIPAL SOURCES OF NOISE EXPERIENCED IN THEATRES

1. Mechanical equipment
   a. Ventilating equipment—blowers and driving motors, fans
   b. Booth equipment—projectors and driving motors—transverters and motor generator sets, noisy arcs
   c. Stage equipment—scene shifting
   d. Heating equipment—or combined auxiliaries with the ventilating equipment
2. Audience
   a. Walking in aisles and lobbies
   b. Conversation, coughing, etc.
   c. Restlessness while seated, seat noises
3. Noise created in other adjacent parts integral with the theatre building
   a. Elevators
   b. Dance Halls
   c. Bowling Alleys
   d. Industrial Plants
4. Exterior noise
   a. Street noises
      1. Through doors and windows
      2. Through structure
   b. Vibration noises
      1. Subways and Elevated RRs.
      2. Printing Presses
      3. General Industrial Plants

3. DISTORTION

The factors in an auditorium which cause distortion are:

a. Reflection of sound from surfaces at a time interval after the original sound too great for the ear to comprehend as one sound.
b. The absorption of energy at different frequencies or pitches in unequal amounts.

REFLECTION

Reflection of sound from walls and other bounding surfaces has two distinct effects. One is to increase the loudness of the sound throughout the auditorium and is helpful in articulation. The other effect of such reflections when they are delayed beyond a short interval of time is not to increase the loudness of a specific syllable or speech sound, but to act on the ear as an independent sound. If the individual reflection is intense and the interval sufficiently great an echo will result. Otherwise it will merely interfere with correct receptions of the desired sound.

The ear will accommodate itself to two similar sounds of equal loudness slightly displaced in time and hear them as one sound somewhat louder than either of the two parts. However, as the displacement in time between these sounds becomes greater, the increased articulation gained by greater loudness is more than offset by the loss in articulation due to confusion between the two sounds. Since the control of the relative intensity and consequent loudness and the time interval between the original sound and its successive reflections, are governed by the shape and acoustic absorption of the reflecting surfaces, the relationship of time of reverberation to acoustic quality may be seen.

UNEQUAL ABSORPTION

The ability of materials to absorb sound is dependent upon the frequency or musical pitch of the sound. In only a few specially constructed materials, generally not practicable for theatre use, is the sound absorption equal throughout the entire range of frequencies. It is obvious that if the total absorption in the room is greater at one portion of the frequency spectrum than at another, the composite sound heard by the ear (including the original sound and the energy reflected from the surfaces) will be relatively louder in that portion of the spectrum where the absorption is less. That is, if a material is used having high absorption in the range of the piccolos and low absorption in the range of the cellos, a duet by these instruments would sound unnatural, as the cellos would be louder relative to the piccolos than the artists intended. (See Fig. 4, page 92.)

The ear is not too critical of deviations, and considerable departure from an ideal condition is permissible. However, a very undesirable effect may be caused if the total absorption in the room is greatly different throughout the frequency spectrum. The condition of "dead" rooms is frequently due more to the fact that the high frequencies are more rapidly absorbed than others, rather than to the total quantity of absorption.

ARTICULATION

While some consideration should be given to the naturalness of speech, in general the principle requirement is that it be perfectly understood. The correctness with which speech is transmitted through any acoustic system, such as a telephone line, a radio system, or an auditorium, may be measured by determining the percentage of individual speech sounds that may be correctly understood when they are correctly produced. Such measurements represent the "per cent articulation factor" of the system; that is, if 80% of all speech sounds are correctly interpreted, the system has an articulation factor of 80%.

Such prediction may also be used in the future when a greater amount of empirical data is secured to establish limits of size and shape of theatres for each desired purpose. For the present, however, the employment of these factors directly in auditorium design is an intricate process, and a simpler method using time of reverberation and certain arbitrary rules is outlined, which should give a fair measure of

success in simple auditoria, and possibly be satisfactory in larger and more complex cases.

EFFECT OF VARIATIONS IN SIZE OF AUDIENCE

1. COMPUTATION

With the preliminary layout of the theatre completed, the number and type of chairs that are to be employed should be determined, the amount of aisle and other carpet estimated, and a computation made of the time of reverberation. This may be done using the Sabine or the Eyring formula. While the latter is somewhat more exact, the Sabine formula is simpler to use and should be satisfactory for present considerations if the desired time of reverberation is determined on a similar basis. For convenience, a graph (Figure 2) is included, on which is indicated various times of reverberation indicated as optimum for different houses by various authorities. These times of reverberation were either computed by the Sabine formula, or were measured under circumstances that approached the required conditions for accuracy of this formula. The range of values is rather large, being lowest where speech only is a consideration, and highest where music is to provide a major portion of the auditorium's use. From a comparison of the selected optimum time of reverberation and the computed time of the auditorium, the agreement between the two may be determined and the amount of additional acoustic absorption required may be determined.

Special consideration should be given to the acoustic characteristics of the chair selected. In auditoria where a variable audience is anticipated this becomes of primary importance in the quality of results obtained.

2. CHAIRS

The audience will comprise from 40 to 60 per cent of the acoustic absorption in the average theatre; and if its quantity is variable, the time of reverberation will fluctuate with changes in the number of audience. The only practicable method at the present time of overcoming this variability is to employ chairs, the seat and back of which offer a relatively high coefficient of absorption. Chairs are available that when empty offer absorption fifty to seventy-five per cent of that when occupied. The merit of employing such chairs is obvious from the attached graph (Figure 3), which indicates time of reverberation for different audience conditions of two typical auditoria having the same volume and seating capacity, and approximately the same time of reverberation at two-thirds audience, one employing high quality chairs, the other employing extremely poor chairs of the ordinary ply-wood type. The time of reverberation of the theatre employing wooden chairs is also shown, assuming that sufficient fixed absorption were added to reach limiting acceptable values for all audiences. The auditorium is then too dead for the normal conditions of more complete attendance and while acceptable, too reverberant for less than one-half audience. The use of the highly absorptive seat gives times of reverberation within plus or minus ten per cent of optimum for the majority of the conditions of attendance, and well within acceptable even when empty. For convenience, there is included in Table 1 the absorptive values of various standard types of theatre chairs when empty.

3. ACCEPTABLE CONDITION

Attention is directed to the use of an acceptable in addition to an optimum value. **A theatre should be designed so that its time of reverberation, in addition to being optimum at the largest average audience (which, lacking other information, may be generally assumed as two-thirds of the total), must be within at least acceptable limits for the smallest anticipated audience.** The type of theatre has much to do with the anticipated small audience. In motion picture houses other than the so-called "presentation" house, the first matinee performance may run as small as 15%. In the chart, Figure 2, there is indicated the limit of acceptable time for talking picture houses. This is a special case and is applicable as the poorest condition that may be considered commercially acceptable; and further applies only for sound reproduced by means of directional projectors. To specify definite limits of acceptability for each of the different classes of use of an auditorium is scarcely feasible, due to variations in the standards and requirements of the different houses. The tolerance or deviation from the optimum condition should be less for original production of speech than is indicated for reproduced speech and music. This must be given special consideration and in general, should be as near the optimum time selected as practicable.

REDUCTION OF EXCESSIVE REVERBERATION

If the time of reverberation, computed as above, is excessive compared with desirable values, there are two methods of attack:

1. REDUCTION OF VOLUME

This is particularly desirable where the loudness obtained from original speech is the controlling factor.

2. ADDED SOUND ABSORPTION

Materials having high values of sound absorption may be added to wall or ceiling surfaces, in amounts sufficient to adjust the time of reverberation to satisfactory values.

ABSORPTION COEFFICIENTS OF THEATRE CHAIRS

BACK \ SEAT		Plain wood seat	Panel of padded upholstery attached to wood seat		Upholstery and padding applied over springs	
			Leather	Velour	Leather	Velour
Plain wood back		0.2	0.7		1.1	
Panel of padded upholstery attached to wooden back	Leather	0.7	1.2		1.6	
	Velour			1.9	2.0	2.3
Fully upholstered padded back. No springs	Leather	1.1	1.6		2.0	2.3
	Velour				2.5	2.8
Upholstery and thick padding applied over springs	Leather				2.3	
	Velour				3.2	3.5

Adopted from data furnished by American Seating Company.

NOTE: * The absorption of mohair upholstery may be assumed to be the same as that of velour. Imitation leather is considered the same as leather.

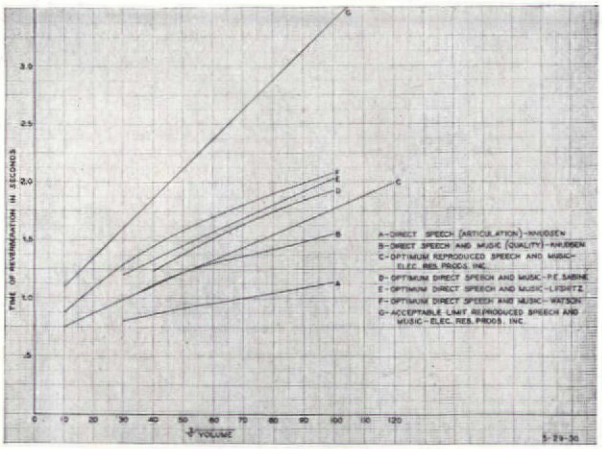


FIGURE 2

OPTIMUM AND ACCEPTABLE TIMES OF REVERBERATION

The above curves indicate suggested optimum times of reverberation, and an acceptable limit for a special case discussed in the text, of auditoria for different purposes. The times are plotted with respect to the cube root of the volume. The curves C and G are furnished by Electrical Research Products, Inc. The other curves are taken from various writings and publications of the indicated authors.

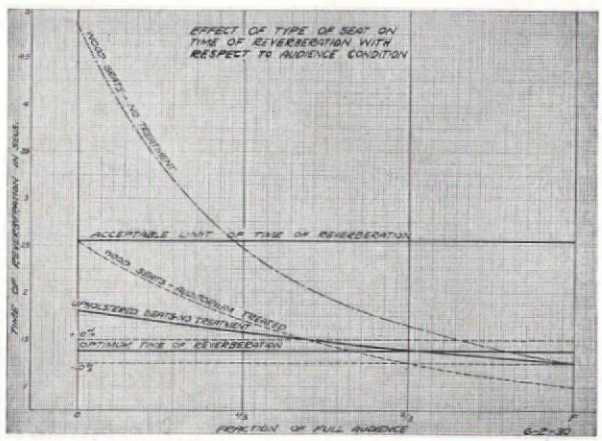


FIGURE 3

TIME OF REVERBERATION FOR DIFFERENT NUMBERS OF AUDIENCE

The curves indicate the times of reverberation for different audience conditions in a typical auditorium, having a volume of approximately 200,000 cubic feet. For the curve labelled "No Treatment" it was assumed that no specific acoustic treatment was added to the theatre.

TYPES OF MATERIALS

The materials available for introducing added sound absorption may be roughly divided into six classes:

1. DRAPERIES

Draperies for this purpose should be of a heavy, soft body, such as velour; and to secure the best efficiency of absorption should be loosely draped, in general utilizing at least thirty per cent additional material to cover the surface. Their employment in too large quantities is generally undesirable from an aesthetic standpoint, and the absorption is largely in the higher frequency range. Draperies may be flameproofed where required, although their absorption is, in general, slightly reduced by this process.

2. ACOUSTIC PLASTERS

Acoustic plaster is frequently applicable in new construction, as it may be used in lieu of the normal finish coat of plaster. The absorption coefficient of such plasters is relatively low, but since large areas are generally available for treatment, such as entire ceilings, they are frequently adapted. For surfaces where echo or concentration effects are anticipated, plasters are not generally suitable, since a material of high absorption is required. Since the efficiency of acoustic plasters is dependent upon the skill and care with which they are erected and surfaced, careful supervision of this work by a competent engineer must be arranged to insure that the erection is in accordance with methods known to produce the desired amount of absorption. Such plasters are of course "fireproof" within all building code requirements.

3. ACOUSTIC TILES

Acoustic tiles of various forms are available, many predecorated and others suitable for decoration after erection. For some types of interior treatment the tiles are a very helpful medium, since relatively high coefficients may be obtained and pleasing architectural effects produced. The acoustic tiles are available in various degrees of fire resistance.

4. FELTS

Hair felt is the oldest form of acoustic material. It is available today, as well as various modifications, including mixtures with asbestos fibre felts composed of jute and of wood fibre. In general, the felts must be employed in plaques or panels behind thin or porous draperies. The felt containing asbestos fibre is employed together with a thin membrane by one of the commercial companies to simulate ordinary plaster by painting the membrane after the felt is erected. Felts are inherently not fire-resisting. They are available in various degrees of fire resistance, from highly inflammable to reasonably resistive. Further objection is found to many forms of felt in that they offer breeding places for vermin and may produce undesirable odors in damp locations. Some felts are processed to remove these objections.

5. BOARDS

A number of common building boards have some absorptive value. They are generally inefficient, but have desirably uniform characteristics of absorption with respect to frequency. Their employment is not generally recommended due to difficulties in decoration, as they must be left unpainted or treated with special stains. The boards available for acoustic use are all inflammable. Any existing methods of fire-proofing destroy their acoustic properties.

6. SPECIAL

Newly developed materials are being added to the list continually. There is available a product consisting of ground paper and asbestos particles which may be sprayed on to the surfaces, where it is held with an emulsified asphalt. This material offers interesting possibilities and is reasonably fire-resisting, but is extremely fragile. The employment of porous cinder blocks, leaving the interior surface unpainted or sprayed with special acoustic paints, offers possibilities for development. Various contractors utilize special systems and combinations of systems to gain the desired results.

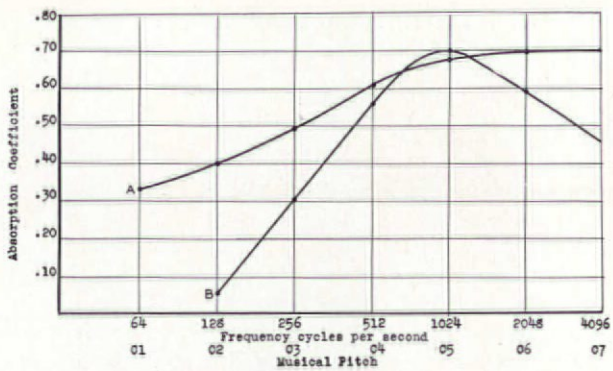


FIGURE 4

COMPARISON OF THE ABSORPTION FREQUENCY CHARACTERISTICS OF TWO COMMERCIAL SOUND ABSORBING MATERIALS

Curve A represents a material having characteristics considered excellent. Curve B indicates a material which, while highly efficient at 512 cycles (the frequency most commonly employed in computations), has an absorption frequency characteristic considered poor. (It may be noted that the absorption at 1024 cycles is over ten times that at 128 cycles.) This latter frequency is about that produced as the basic pitch of a male voice.

SELECTION OF MATERIALS

In the selection of a proper material consideration must first be given to the locations which require treatment and other surfaces that are available. The surfaces upon which concentrated energy from sound projectors may be incident should be treated with an efficient material. Consideration should then be given to the necessary coefficient for the remainder of the material necessary to obtain the required amount of absorption. The decorative requirements should then be considered, selecting a material which meets the above requirements. The absorption frequency characteristics should then be compared and primary consideration given to that material having the most nearly uniform characteristic.

HEATING, COOLING, AND VENTILATING THE THEATRE*

Increasing demand for physical and psychological comfort has made the heating and ventilating of the modern theatre a problem of complete air-conditioning.

Data collected by the American Blower Corporation show that in an uncooled theatre the average weekly attendance is 64,905 for all months with the exception of June, July and August. In June, July and August the average weekly attendance is 51,582, a drop of 13,323 paid attendance per week during the three hot months. In a cool theatre the average weekly attendance for all months with the exception of June, July, and August, is 58,373, while during June, July, and August, the weekly attendance is 59,300.

A satisfactory system of air-conditioning must automatically control air volume, air temperature, relative humidity, air motion, and air purity. The requirements of the legitimate theatre and the movie theatre present two distinctly different problems. The legitimate theatre is seasonal, occupied about three hours at a time, usually after sundown, and closed during the hot summer months. The movie theatre is occupied, often to full capacity, for twelve hours per day every day in the week and all year round. The air-conditioning plant must be able to meet the requirements of the two extremes of outside weather conditions. The volume of air to be handled in the movie theatre is therefore often more than twice the volume required for the legitimate theatre.

A. AUDITORIUM

The warming of the auditorium is really a deheating problem. The heat radiated from the occupants of the seats and from the lights usually exceeds the heat loss through the walls and the roof of the building even in the winter time. The removal of the excess heat and moisture can only be accomplished through a complete ventilating system; and the fresh air must be admitted at a temperature lower than that of the room to effect the necessary cooling. (A typical case for winter conditions might show 300 B.t.u. of body heat, plus 100 B.t.u. per person from lights, etc., being given up to the building, against 200 B.t.u. heat loss from the building, per person per hour. This would mean that 200 B.t.u. per person per hour must be carried away by the ventilation.) The quantity of air to be supplied and removed by the ventilating system is determined by the number of persons to be seated in the theatre. Desirable standards vary from 25 to 30 cubic feet of air per occupant per minute.

1. SYSTEMS OF DISTRIBUTION

It is important that the conditioned air introduced in the auditorium be distributed evenly with respect to the amount of heat to be absorbed in the various parts of the room. Three methods of distribution can be used.

a. Ejector System. The conditioned air is introduced through a series of ejector nozzles near the ceiling and the underside of the balconies in the back of the auditorium, discharging horizontally at high velocity. Losing speed, the air moves down and is removed through exhaust grilles located near the floor at the back of the auditorium. **This system is the cheapest in initial cost and insures an effective mixture of the air in the auditorium. It cannot, however, be used where the ceiling and the underside of the balconies are beamed or have protruding forms that would interfere with the air current.** The advantages of the downward air movement will be discussed below.

b. The Upward System. The air is introduced through mushroom hoods in the floor and exhausted through the ceiling, utilizing the natural upward rise of the air after it has absorbed the heat radiated from the seated persons. **This system is not generally used. The air has to be introduced at a low velocity in order to avoid draught; and the two features that cool air strikes the feet and that the body odors and dust are carried up with the air are objectionable. The use of mushroom hoods furthermore necessitates an expensive system of air-tight chambers under the floor.**

c. The Downward System. The conditioned air is projected horizontally into the auditorium near the ceiling or through diffusers in the ceiling against a horizontal baffleplate and spread evenly over the whole upper area of the auditorium, mingling uniformly with the air in the room. Moving down, the air absorbs outer heat transmitted through the walls and the roof and the heat emitted by the occupants of the seats, and finally reaches the desired temperature and humidity before it strikes the seated persons. The air is then removed through exhaust

* By K. Lönberg-Holm.

outlets near the floor. The moving force of the inlet fans makes the upward effect of the heat from the people negligible.

B. LOBBY

The lobby and foyer can usually be included in the general air-conditioning system. Additional banks of direct radiation in recesses near the doors, or a special fan system discharging through grilles at each side of the doors, should be installed to insure quick heating and to prevent cold air from being blown into the auditorium. If there are two sets of doors in the lobby both sets of doors should be equipped this way.

C. STAGE

Sufficient radiation should be installed to prevent air currents in the front part of the auditorium from interfering with the air-conditioning system. The radiation should be evenly distributed and special provision should be made for exterior doors leading to the stage. The wall radiation is usually placed at two or three levels on the exposed walls, and additional heating coils provided in the skylight, and immediately above the proscenium opening.

D. PROJECTION ROOM

The projection room can be included in the general air-conditioning system but should have a separate exhaust system for the projection machines, to protect the film from contact with dirt-laden air.

E. DRESSING ROOMS, TOILETS, REST ROOMS

These rooms can be included in the general system. If necessary, additional direct radiation is installed on exposed walls. The toilets should be equipped with separate exhausts.

F. RECIRCULATION

A saving of up to 50% in fuel consumption can be effected through recirculation of a portion of the air used for the air-conditioning system during the winter. The recirculated air should be cleaned before it enters the distribution ducts.

G. COST DATA

Approximately 75 to 100 tons of refrigeration are required per thousand people.

A complete ventilating plant with refrigeration will cost from $200 to $800 per ton of refrigeration.

Initial expenditures are approximately $35 per seat. This includes a complete conditioning system with refrigeration machine. Cost of operation per day per seat throughout the year averages between 3 and 3½ cents. This includes depreciation, engineer's salary, power, steam, water, interest on investment, and all incidentals. Naturally the cost of operation during the winter is much less than in the summer.

Assuming that each seat is occupied at least twice a day, the cost per ticket is slightly over 1½ cents. The system replaces the ordinary heating, air-washing, and fan system that might be installed.

Estimating the maintenance of this system at 2 cents per day per seat, brings the additional cost of the complete air-conditioning system down to 1 cent, or ½ cent per expected patron. The difference per day per 1,000 seats is approximately $15. A daily sale of 43 additional tickets at the low average of 35 cents absorbs this excess.

LIGHTING FOR MOTION PICTURE THEATRES

The following suggestions are from an article on "Theatre Lighting"* by Frank Cambria** and Francis M. Falge.***

There should be a well-planned, single-circuit system of illumination for lobbies, foyers, rest rooms, etc., which should be graduated in intensity from street to auditorium.

Lobbies should be bright and cheerful.

Many small bright sources of light are pleasing for lobbies.

Foyers should be of lower intensity with soft colored lights.

Rest rooms should be colorfully and comfortably lighted.

There should be a specially planned and controlled system of auditorium lighting, making possible the advantages of mobile color and of a variety of effects. There must also be a comfortable, glareless system for the showing of pictures.

There should be no bright light sources near the line of the vision of the picture.

Stray light should be eliminated from the picture sheet as much as possible.

Sufficient light should be provided so people may easily locate seats, and so that accidents may be eliminated.

Sufficient light should be provided to discourage undue familiarity, but not so much that patrons are distracted by the movements of others.

Aisle lights and side-wall brackets should be on separate circuits, controlled from the stage switchboard.

Cove circuits should be carefully planned for many variations of quantity and quality of light. They should be on dimmers.

There should be a carefully devised emergency lighting system, separate and distinct from the other lighting arrangements, connected with storage batteries as per building code.

* A paper presented before the Twenty-third Convention of the Illuminating Engineering Society, Phila. Sept. 1929. November issue of *Transactions of the Illuminating Engineering Society*, 29 West 39th Street, New York City.

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*** Lighting Specialist, Publix Theatres Corp.

Local, state, and federal codes must be strictly adhered to.

There should be a separate lighting system for cleaning, preferably a permanent one, but at least including portable lights and conveniently located outlets.

It is preferable to have concealed units of high intensity which are operated by a switch.

This should include supplementary lighting for passageways and other places which might be included with other circuits not needed for cleaning.

It is highly desirable to arrange the lighting of the motion picture theatre so that the eyes of the patron entering the theatre are not subjected to any sudden and great change in the illumination. If the change from the exterior to the interior levels of brightness can be made gradually and extended over an appreciable period, the adaptation processes have time to operate, and the person entering will be able to see comfortably at the illumination level existing within the auditorium. From the measurements of illumination and brightness, it is possible to trace the decrease in brightness level as the patron passes through the various entrance areas. In the accompanying table are tabulated some of these values in a way calculated to illustrate this brightness decrease in the case of a person entering the theatre through the main lobby, orchestra foyer, and on into the central portion of the main floor.

IN MAIN LOBBY:		
Just Inside Entrance	(Thirty-inch plane)	15.0 f.c.
Centre of Lobby	(Thirty-inch plane)	2.0 f.c.
Near Orchestra Foyer	(Thirty-inch plane)	1.0 f.c.
Mean Wall Brightness in Lobby		2.0 ml.
MAIN VESTIBULE:		
Just Inside Door	(Thirty-inch plane)	.23 f.c.
Under Main Lamps		.16 f.c.
Mean Wall Brightness		1.6 ml.
ORCHESTRA FOYER:		
Just Inside Door	(Thirty-inch plane)	2.0 f.c.
Directly Under Lamps		.53 f.c.
Near Entrance to Aisle		.09 f.c.
Mean Illumination	(Thirty-inch plane)	.20 f.c.
Mean Brightness of Vertical Surface in Field of View		.25 ml.
CENTRAL PORTION OF MAIN FLOOR, Seat Q-107:		
Illumination on Thirty-inch Plane		.04 f.c.
Illumination on Program at 45 degrees		.06 f.c.

The experience gained from numerous installations indicates that where an auditorium is decorated in silver-leaf and light colors, 10 watts of lighting in each color should be provided for each seat. Where gold-leaf and warm or heavy color decorations are adopted, 20 watts in each color should be provided for each seat to afford "reading" illumination. In urban motion picture theatres, where "reading" light is not required, satisfactory lighting has been effected with as little as 4 watts, each color, per seat.

A. LIGHTING THE ATMOSPHERIC THEATRE *

The illumination of the atmospheric theatre is by far the most important single factor, for the lighting results will in most cases determine the success or failure of the entire project. In a true atmospheric theatre, the auditorium is in reality a permanent stage setting of large dimensions. The aim of the architect is to create an exterior scene taken from some distant land, such as a Spanish courtyard, in which the patrons are seated. The illusion of the open sky is created almost entirely by artificial lighting from concealed equipment. In addition, the general architectural theme must be revealed while the house is in comparative darkness. Here again skillfully located lighting equipment is of the utmost importance.

The evening sky effect, which includes twinkling stars in a field of deep blue across which drift fleecy clouds, is the major theme of the lighting scheme.

For the blue of the sky, continuous reflectors are installed in a cornice or equivalent structure at the imaginary horizon. The ceiling is shaped to approximate, as closely as conditions will permit, a hemispherical canopy. At the point of intersection of the "horizon" it is kept as far back as possible to suggest indefinite origin. An impression of greater depth is secured by giving the ceiling the texture of a "scoured" finish. Great care must be exercised to keep the ceiling surface absolutely even, for this type of illumination greatly accentuates any unevenness. The ceiling should be tinted a *flat pale blue.*

The so-called "natural" blue glass lamps should be used, spaced 12 inches apart around the four walls of the auditorium in a continuous type reflector. Even illumination without "spotting" is highly essential. In addition to blue lamps, amber and red are often used to create special effects such as a sunset during the overture or similar features.

Illuminated stars are secured by placing low candle-power lamps in cone reflectors back of perforations from 1/8 to 1/4-inch in diameter in the ceiling. These lamps are connected to flashing devices to cause a few stars to flash at a time. With the proper ceiling with deep blue illumination, these stars are startlingly realistic. The perforations are laid out to scale to represent the respective positions of the stars in the firmament. The Great Dipper comes in for its usual share of attention.

"Effect machines" of the rotating disk type, concealed in the side walls, project slowly moving clouds across the ceiling. With a well designed ceiling, these clouds actually appear to be at a considerably lower level than the ceiling, which greatly adds to their effectiveness.

Auxiliary lighting equipment concealed in the structural work serves to reveal the dominant architectural features such as arches, columns, and niches.

* A. L. McCABE, Chief Engineer, *Erickson Electric Co.*

This part of the lighting design is of great importance due to the fact that the general illumination of the entire auditorium is necessarily kept at a low level during a major part of the show. Concealed lighting for the organ grille and wall niches from colored lamps in strip reflectors is particularly effective.

A variety of color should be used in the various locations to add interest to the general effect. Amber lamps in shielded wall bracket fixtures, together with a generous use of aisle lights, provide the necessary "working" illumination.

Wall brackets, aisle lights, steplights, and exit lights, are connected to an emergency storage battery system by an automatic throw-over switch in case the building current should fail.

Flush ceiling fixtures or lunettes are provided under balconies and in similar locations where the height prohibits the use of indirect lighting. Through the use of colored light, the general effect can be preserved.

Dimmers are provided on each group of circuits to afford a smooth blending of the various colors as well as to change the level of intensity. All stages of illumination, from mysterious moonlight to the effect of sunshine, may be produced at will.

B. WALL AND CEILING WITH COLOR LIGHTING

The latent possibilities of projected beams of light as compared with pigments for purposes of producing decorative effects have not yet been fully explored.

The walls of the auditorium of the legitimate or movie theatre can be painted a plain white or cream and all decorations may be obtained by shadow or mobile color lighting.

It should be borne in mind that, while the means for obtaining effects are simple and the colors are thrown on a plain background, the effects which can be obtained, both of form and color, are almost limitless.

THE CHARACTERISTICS OF COLOR LIGHTING

From the standpoint of the physicist the image one gets when looking at a painting is composed of the light rays (from sun or artificial light) *less* the light rays absorbed by the pigments used in the painting.

Color effects may be obtained without the use of pigments by, first, absorbing the light rays not desired by a color screen near the observer (stained glass windows), or a color screen near the source of light (stereopticon or movie); second, refracting light into spectral colors with prisms; third, producing color effects through the use of various mediums for producing light (vapor lighting systems, etc.). The stained glass windows, stereopticon, color movie, crystal prisms, diamonds, or even rain drops (rainbows), produce emotional reactions difficult to duplicate with paint.

COLOR LIGHTING ESPECIALLY SUITABLE FOR USE IN THEATRE AUDITORIUM*

Due to the ability to vary the effects to coincide with the type of play and the varying moods of the play, the use of color lighting for decoration of walls and ceilings is especially suitable for theatres.

In decorating the auditorium care is to be taken that during the performance nothing conflicts with the main interest, which is on the screen. It is during intermissions that decorative lighting of the auditorium should be featured.

There are two large groups into which decorative lighting is divided: shadow lighting and mobile lighting. The first makes use of geometrical and conventionalized patterns which may be varied by dimming and changing colors. The second is more abstract, more flexible, and is characterized by a continuous sense of motion and depth.

Shadow Lighting

Color shadow lighting projects beautiful harmonizing forms on either ceiling or sidewall, or both.

Color shadows can be projected either from coves, fixtures or pedestals. The source and placing of the units can best be determined from actual experiment.

As a rule, reflectors are undesirable, as the best color shadows are projected from the clear bulb—a point source of light being the ideal source. In most cases, reflectors tend to fuzz the edges of the shadows and to detract from the design, although in some cases reflectors are of material assistance in securing the effect desired. The recommendations in each case must be the result of experiment; there is no rule of thumb that is reliable.

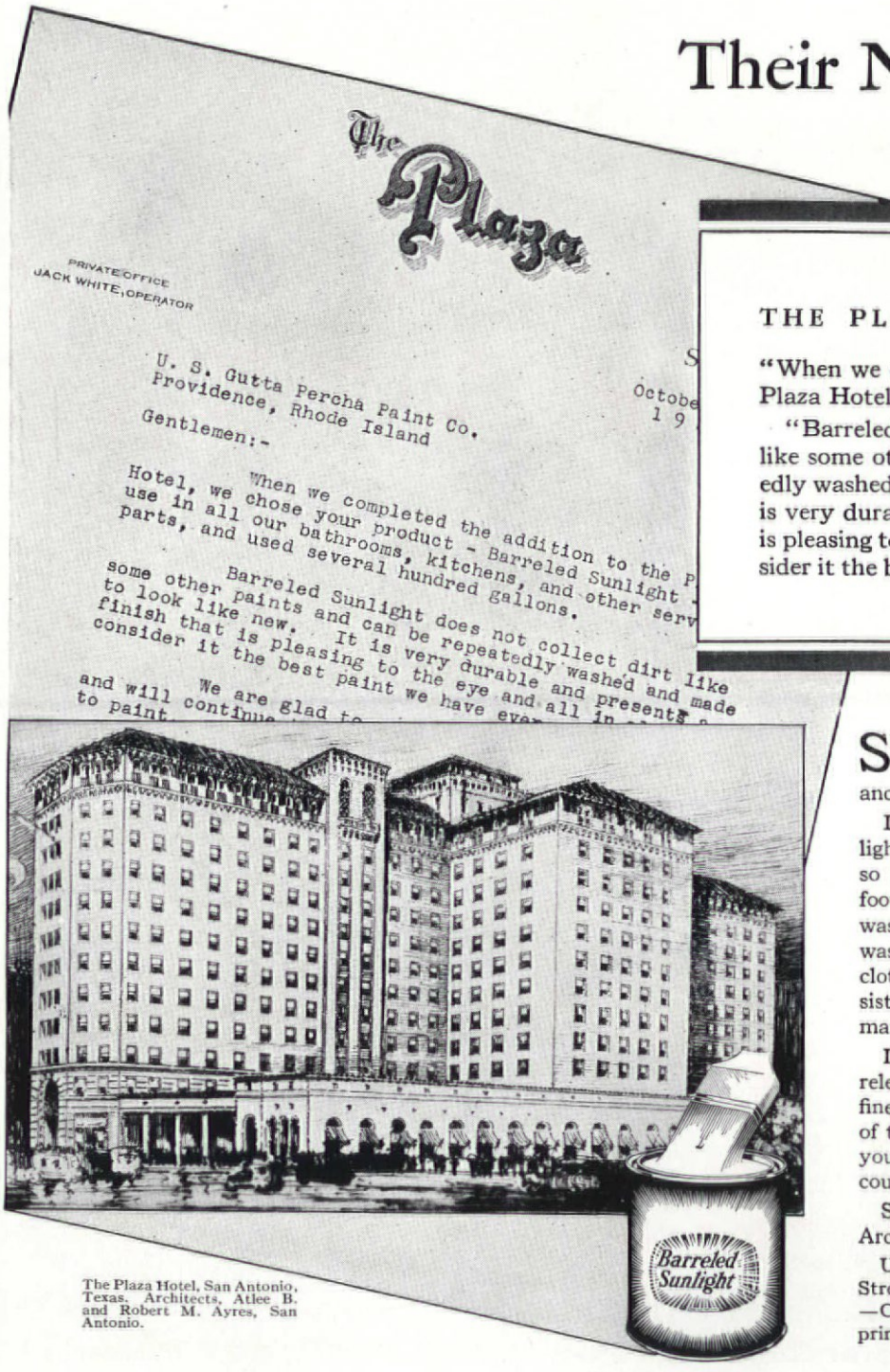
A cove can be so designed that the lamps which produce the color shadow effects also illuminate the room, or the color shadow lamps can be supplementary to the standard cove lighting layout.

With fixtures, a definite pattern can be projected on the ceiling in white light leaving black shadows. Color lighting from standard interior equipment then lights the shadows in solid or blended colors as required. Another type, experimental samples of which have been very successful, is to have only the standard interior color equipment in the fixture and then have an intercepting screen of open work design suspended from the ceiling in the form of a drum. This design is projected in long shadows of various colors which change color and shape as the various sources are dimmed and brightened.

The most effective colors are red, blue, and green. These can be mixed in the proper proportions to produce a white field and then broken up by the intercepting screen. This introduces an element of mystery which always appeals to the lay mind. Amber does not seem to produce effective color shadows and interferes with the other colors. For this reason, it is not recommended.

* *Memorandum*, Curtis Lighting Co., Inc., Chicago.

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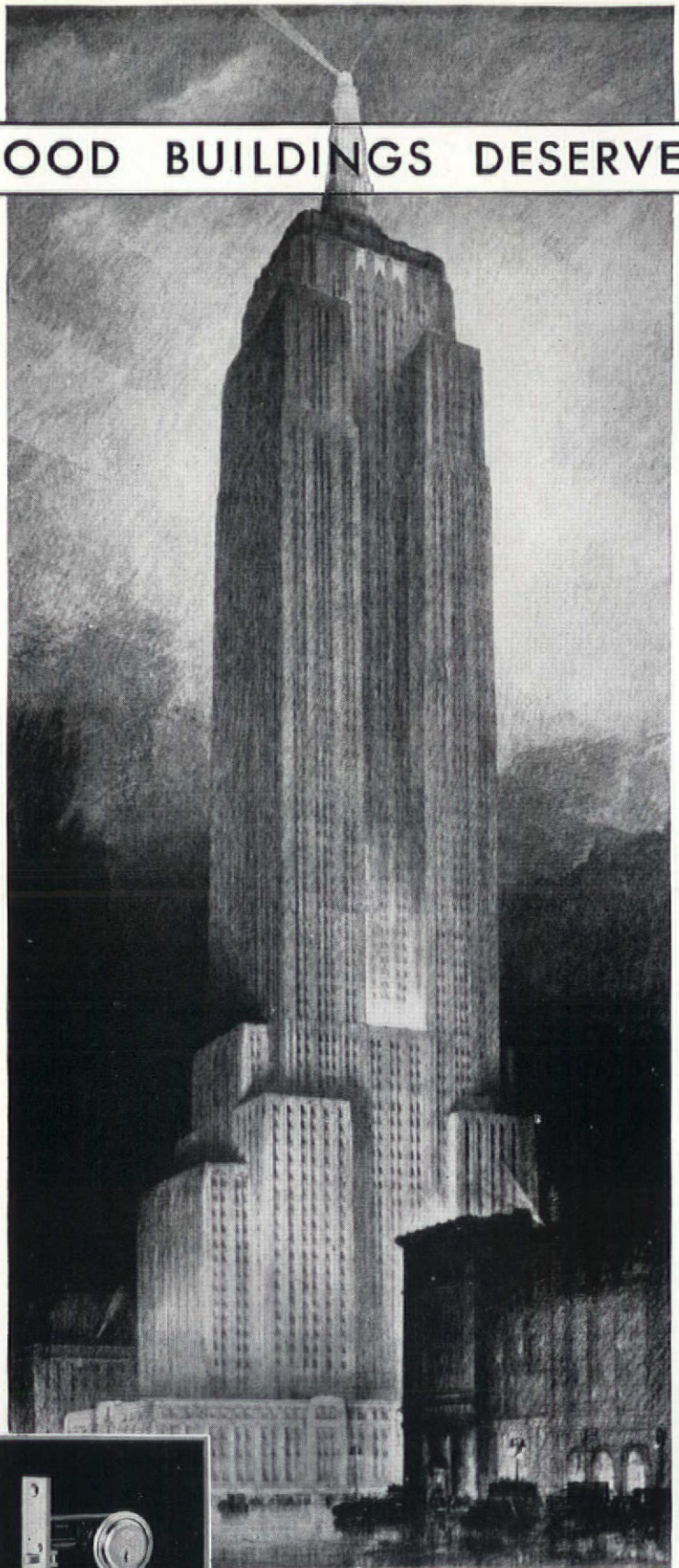
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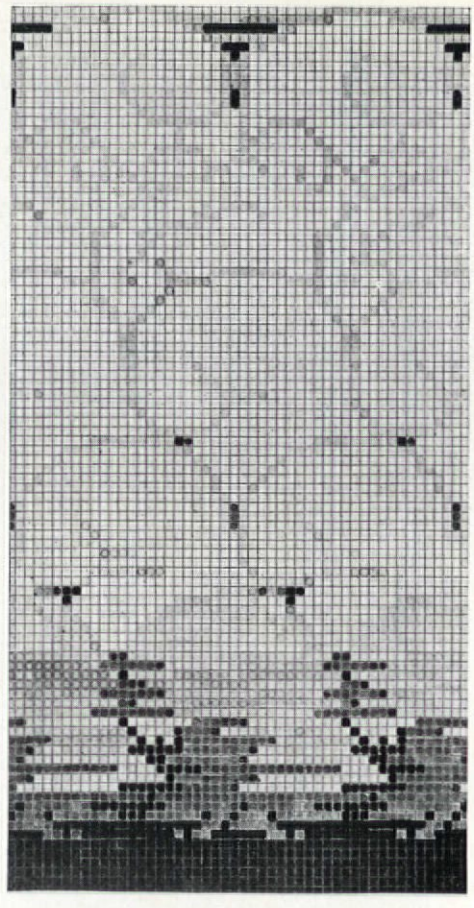
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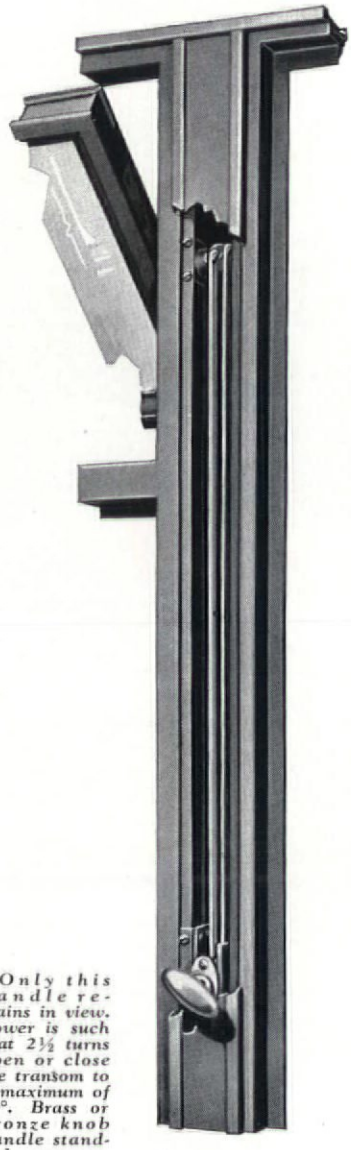
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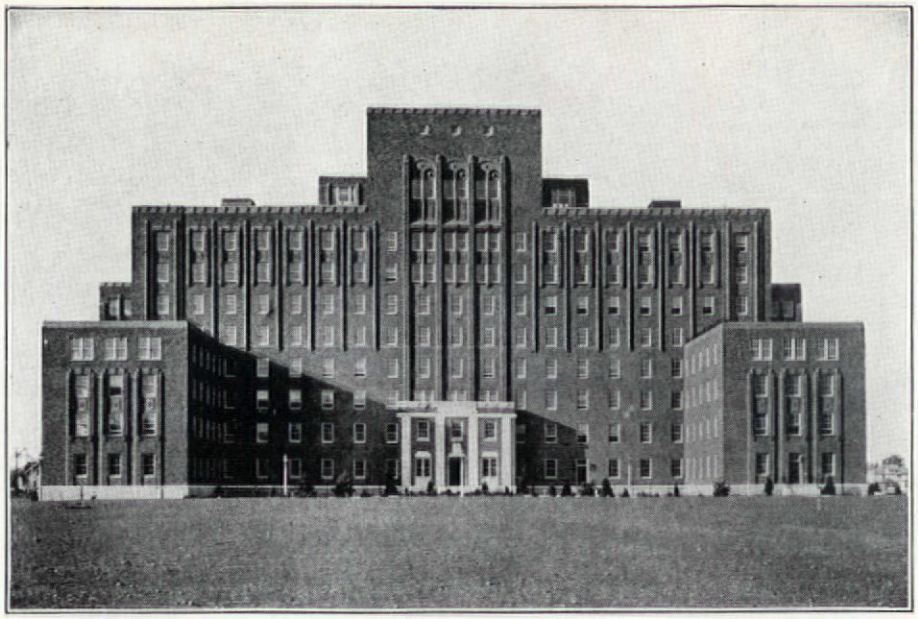
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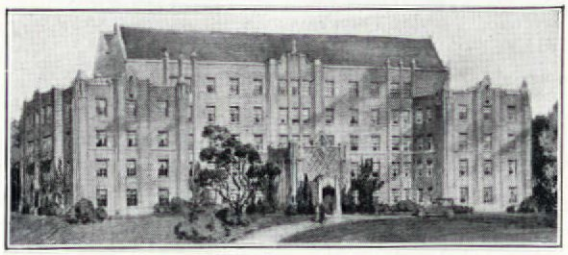
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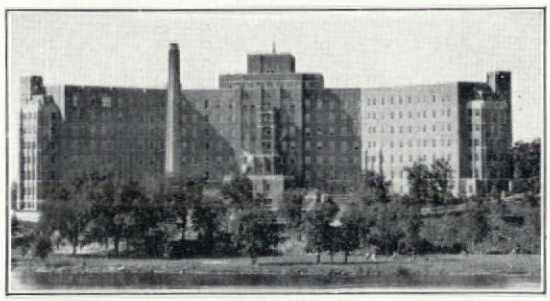


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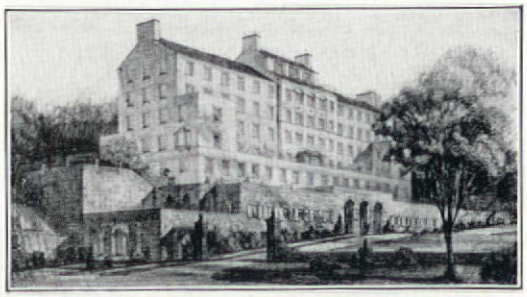
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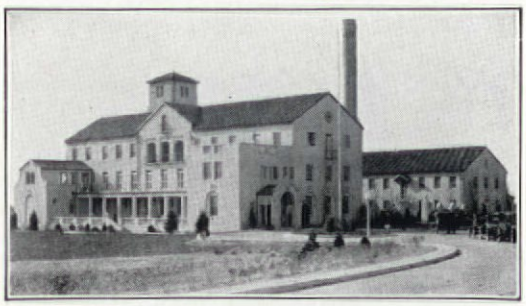
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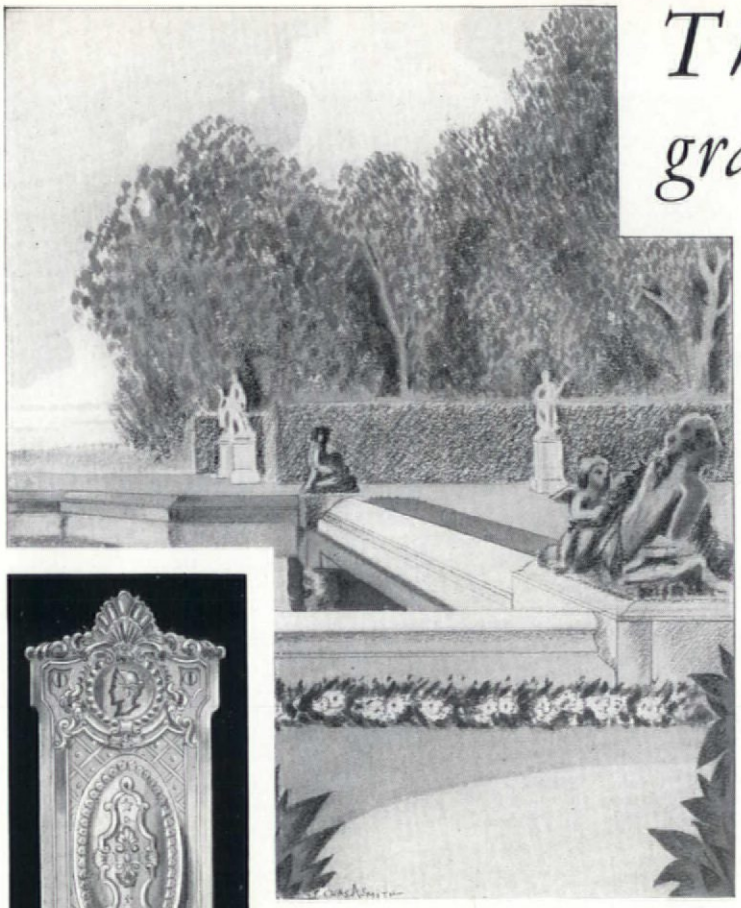
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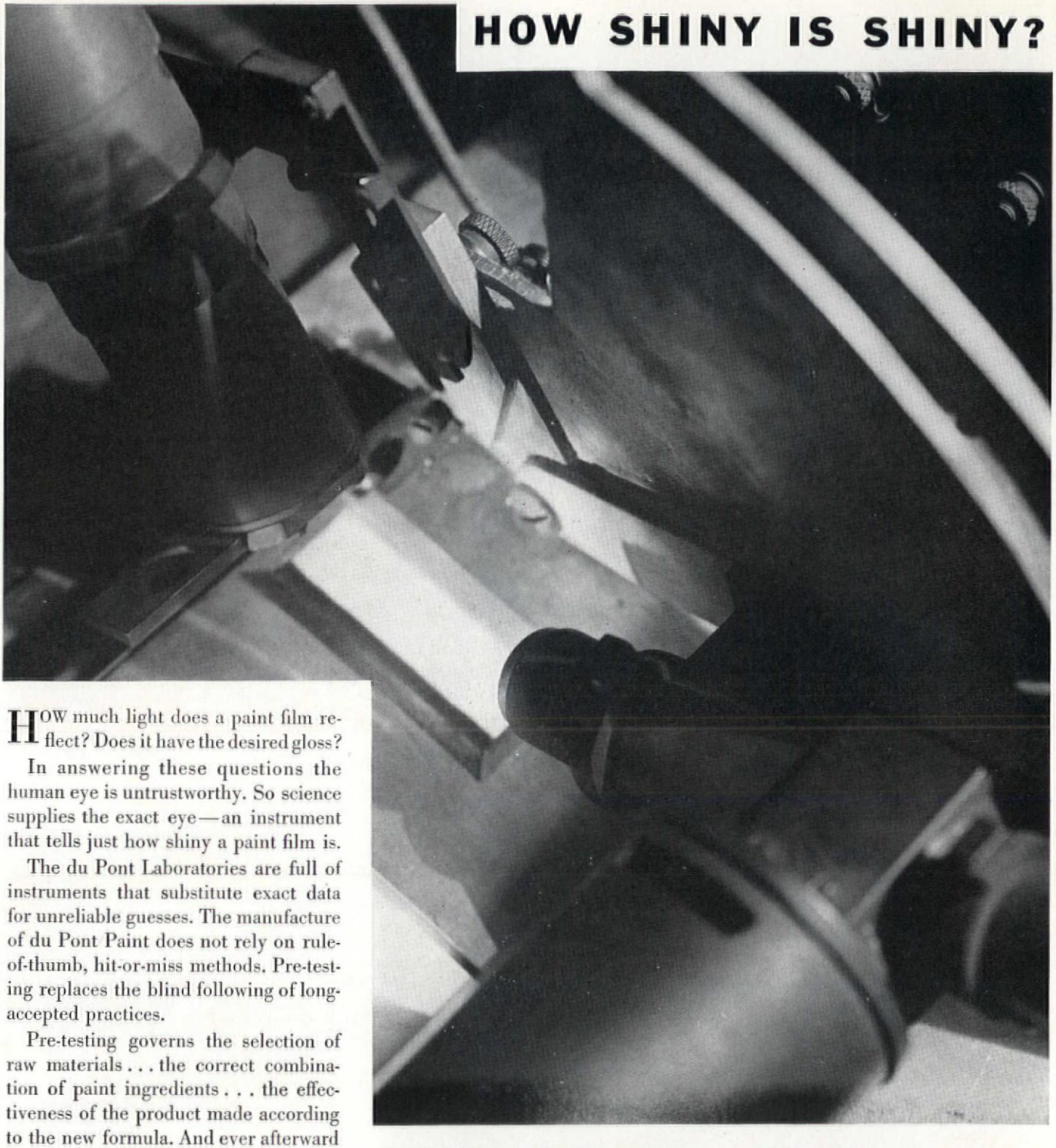


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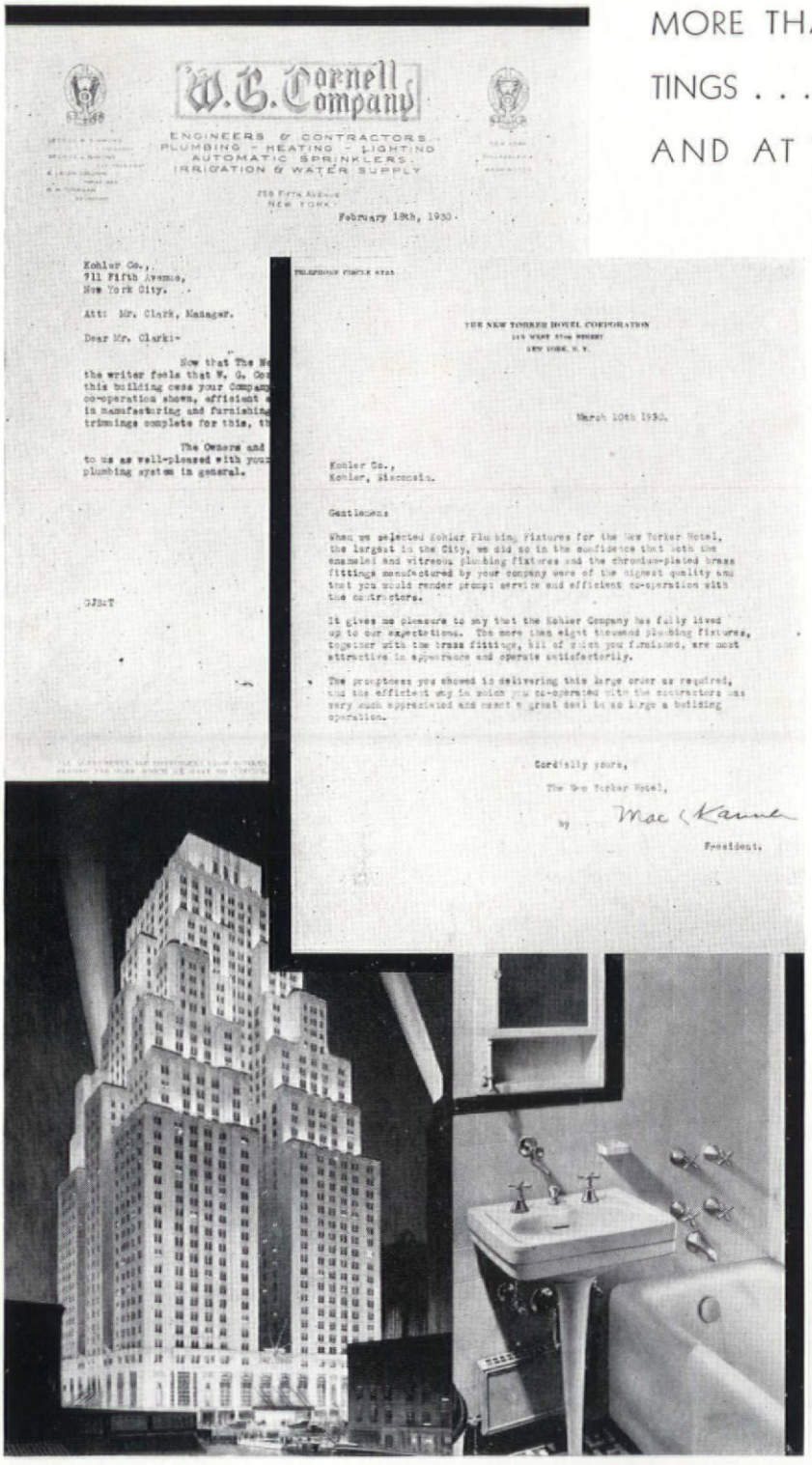
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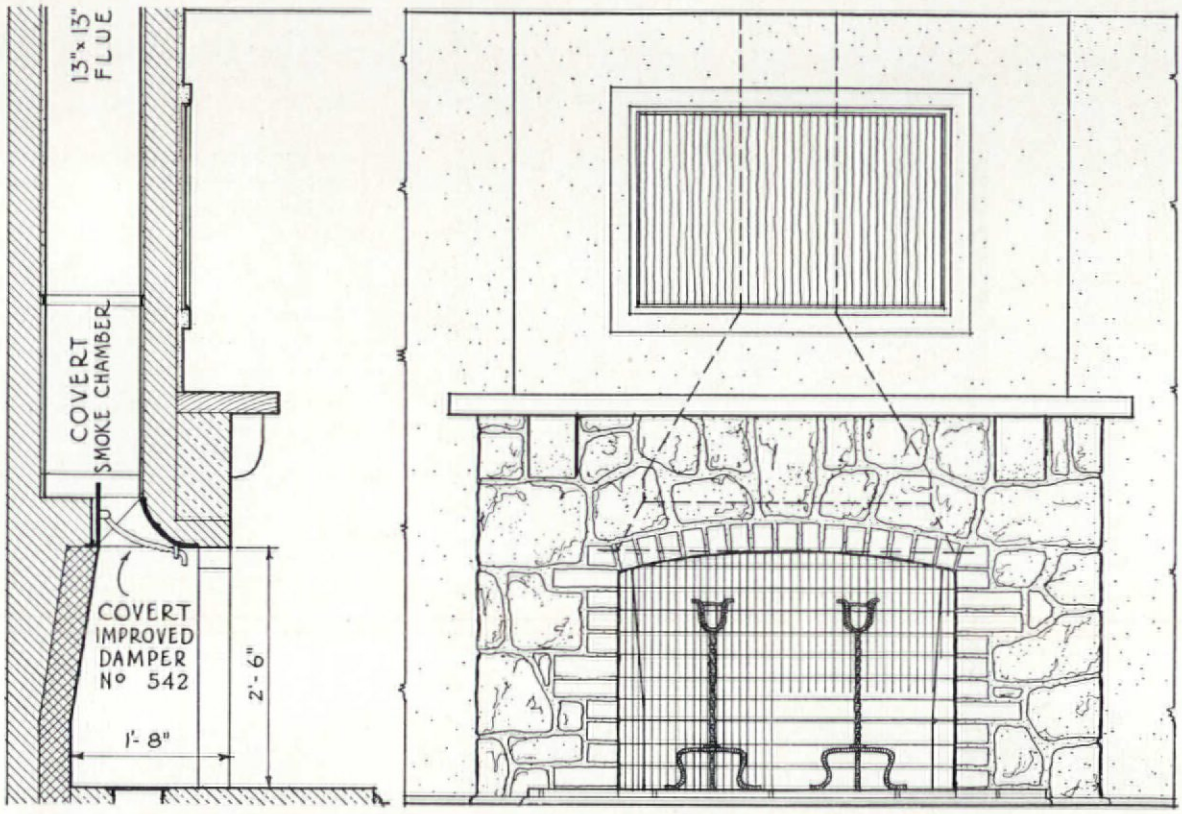
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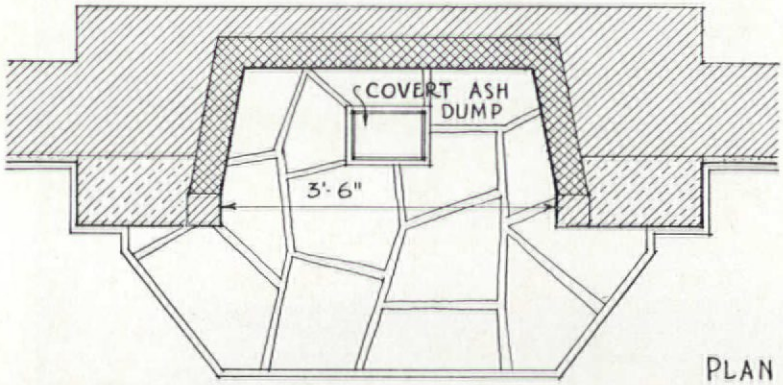
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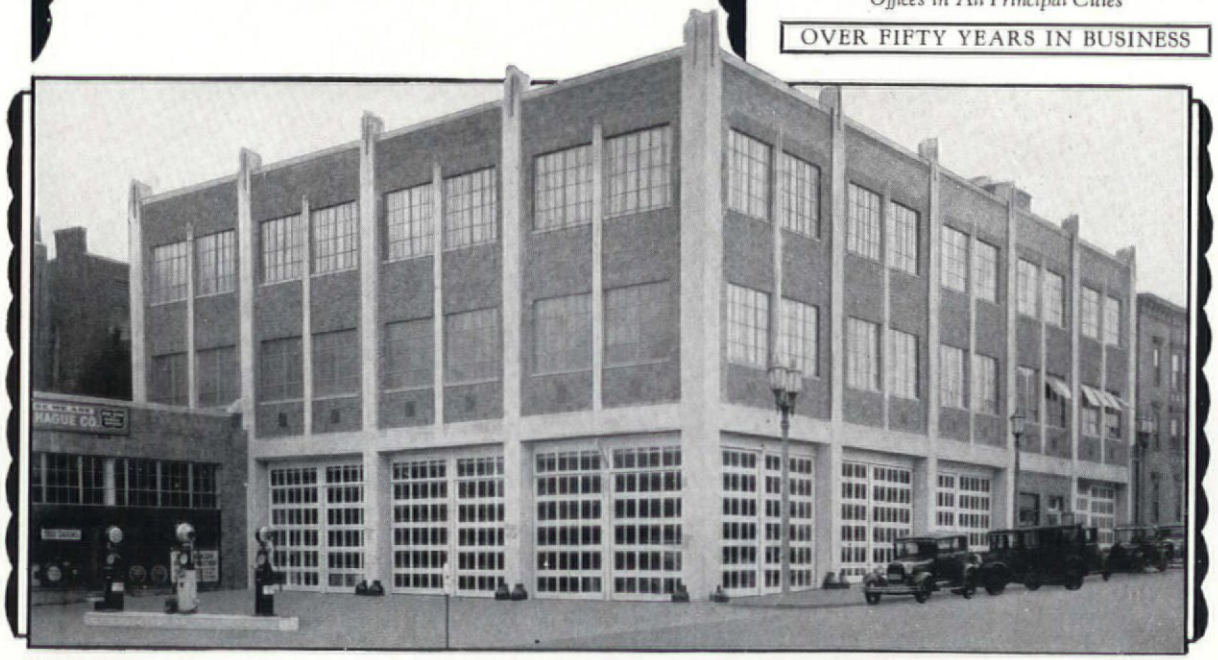
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This Bureau, which has been operating for a number of years, is composed of men amply experienced in greenhouse work. Their suggestions have proved profitable to numerous architects in the planning of private estates.

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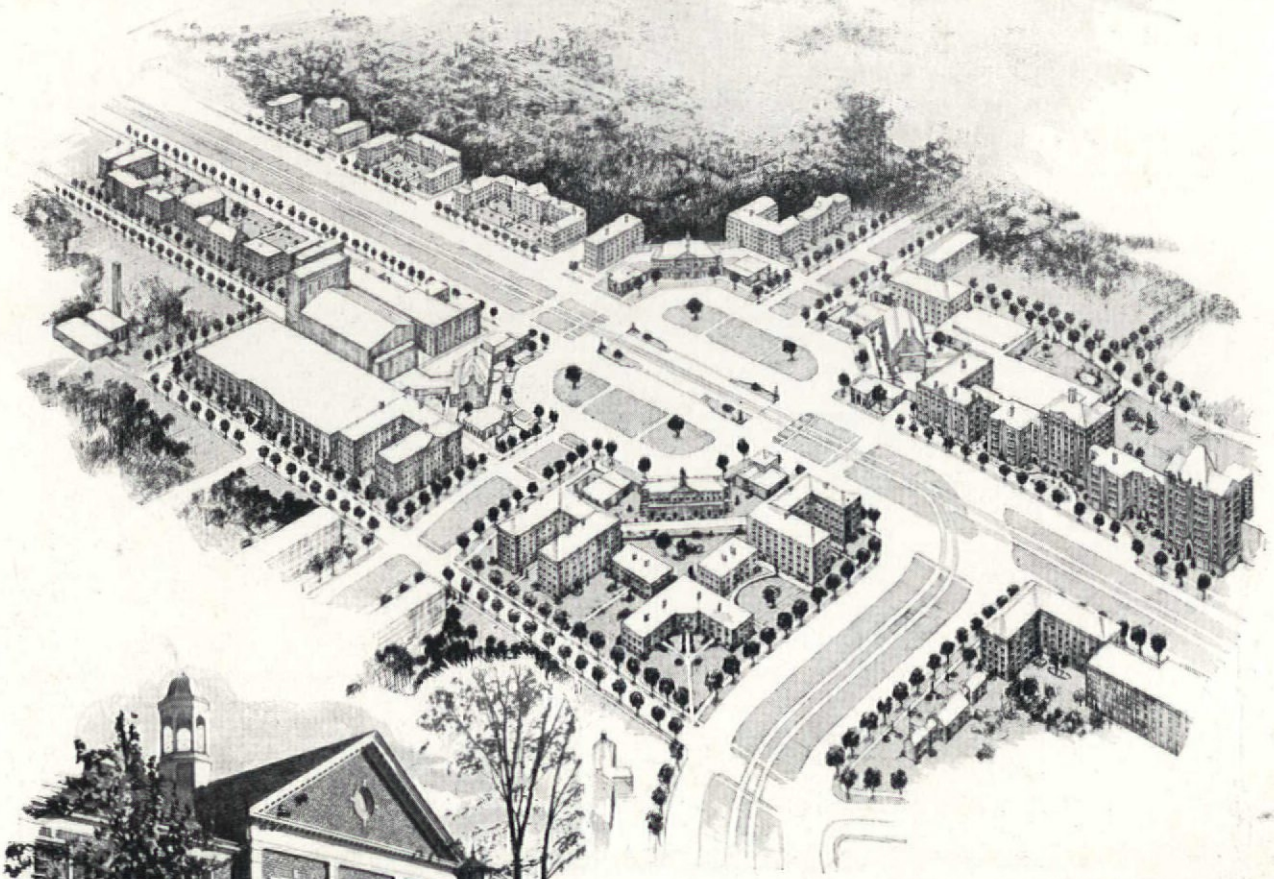
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The beautiful Shaker Square Development at Shaker Heights, Cleveland, comprising a tavern, a bank, a theatre, and a number of stores and shops, demonstrates the wisdom of community planning. Despite the variety of uses to which these buildings are put, harmonious architectural treatment has achieved a most unique effect, impossible to accomplish by haphazard building.

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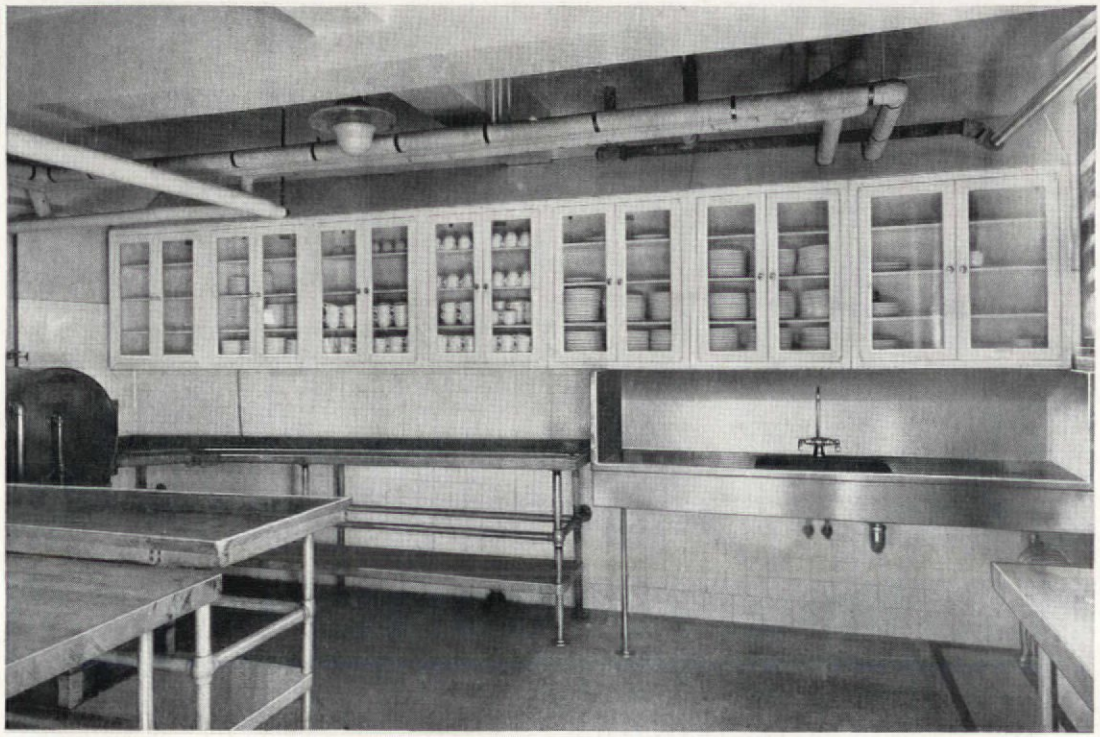
PITTSBURGH, PA.

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CARNEGIE BEAMS

Olean Quality Standard Units of Steel and Monel Metals

. . . equipped this immaculate Kitchen efficiently, economically and permanently



Detailed specifications with list of installations where Olean Kitchen Cabinetry is now being used, will be gladly sent on request.

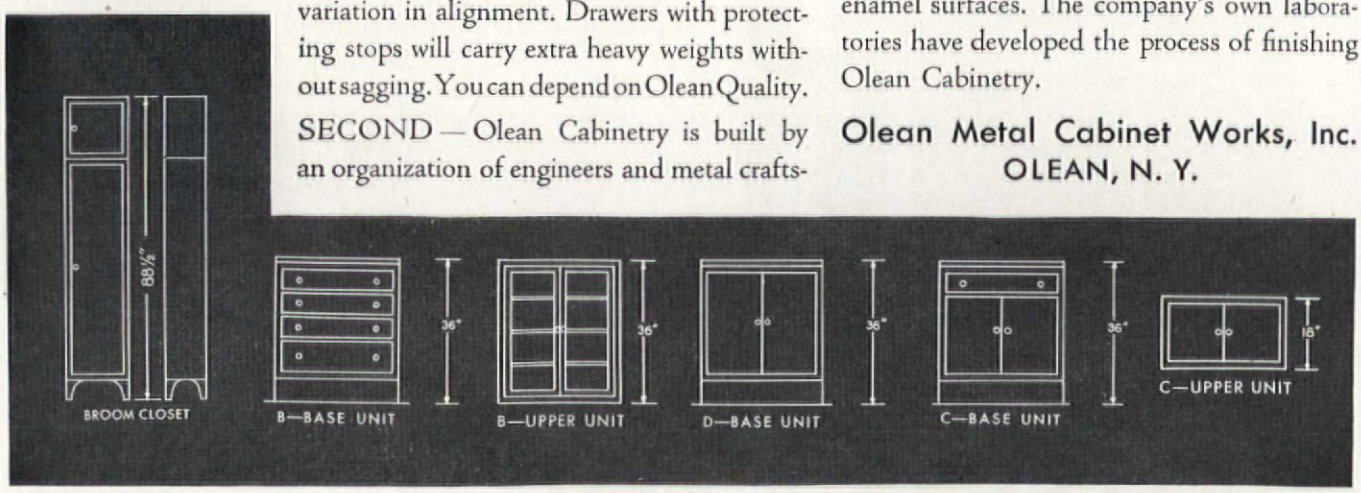
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FIRST—The equipment is designed structurally to give rigidity and strength where needed most. Doors and hinges will stand excessive rough usage without the slightest variation in alignment. Drawers with protecting stops will carry extra heavy weights without sagging. You can depend on Olean Quality.

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in keeping with modern building design



A DIEBOLD VAULT DOOR complements the beauty of a well-designed building, just as furnishings change a house into a home. Each Diebold Vault Door, inside and out, is adaptable to the style of architecture of its building. This is made possible through the close co-operation of Diebold men with the architect. ★ ★ The above door meets the requirements for Class "E" Mercantile Burglary Insurance Classification. It is hung on a gooseneck crane hinge operating on Timken tapered roller bearings. It is seated in its jamb with a four-point pressure bar operated by a hand wheel with six hexagonal bakelite grips. The door is standard with one four-tumbler combination lock equipped with anti-dynamite device, for additional protection. A plate of 5-ply hardened chrome steel protects the locks and bolt throwing handle from burglar attack by drilling. Plates to this door afford protection against drills, torches and explosives. Ideal for jewelers or manufacturing concerns. See Sweet's Architectural Catalogues for details.

Diebold Safe and Lock Company

Canton, Ohio

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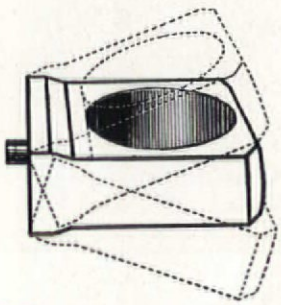


"THE DOOR CAN'T LOCK" ..they say



THE DOOR *MUST* LOCK

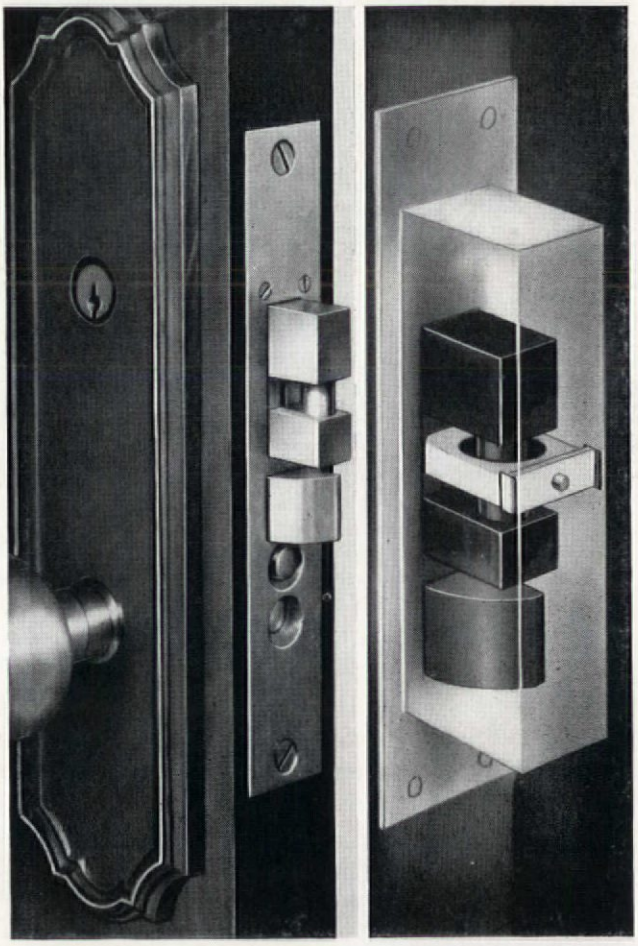
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THIS is the exclusive NORWALK Self-Adjustable Strike that engages bolt from any angle and locks the door regardless of shrinkage, warp or sag.

• • •

Before and since Noah built his Ark, doors have shrunk and warped and sagged. Locks jammed, refused to lock, or took only a precarious, hair's-breadth hold. That day is past. With the entry of this new type NORWALK lock the door *must* lock . . . and lock with a burglar-proof grip . . . regardless of shrinkage, warp or sag.



This new NORWALK *lock embodies, by special arrangement, the patented, jimmy-proof feature of the famous Segalocks.*

This NORWALK lock masterpiece has two features no other lock can duplicate. The entirely new self-adjustable strike that insures an always fastened door. The jimmy-proof vertical bolt that joins door and casing in one inseparable metal grip. A turn of the key makes it a quick, easy operating latch . . . another turn an impenetrable lock. The advantages of the new NORWALK lock are obvious. Architects, Contractors and Builders are invited to write for further facts. Norwalk Lock Co., 12 Warren St., New York.

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LOCKS

AND BUILDER'S HARDWARE

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WHERE BEAUTY DEFIES TIME

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READING IRON COMPANY, Reading, Pennsylvania

Bullock's Wilshire Department Store, Los Angeles.

John Parkinson & Donald B. Parkinson, Los Angeles, Architects.

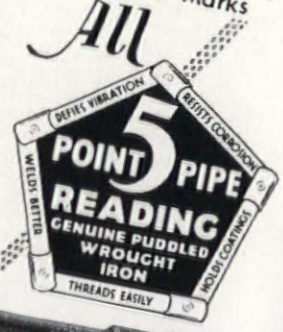
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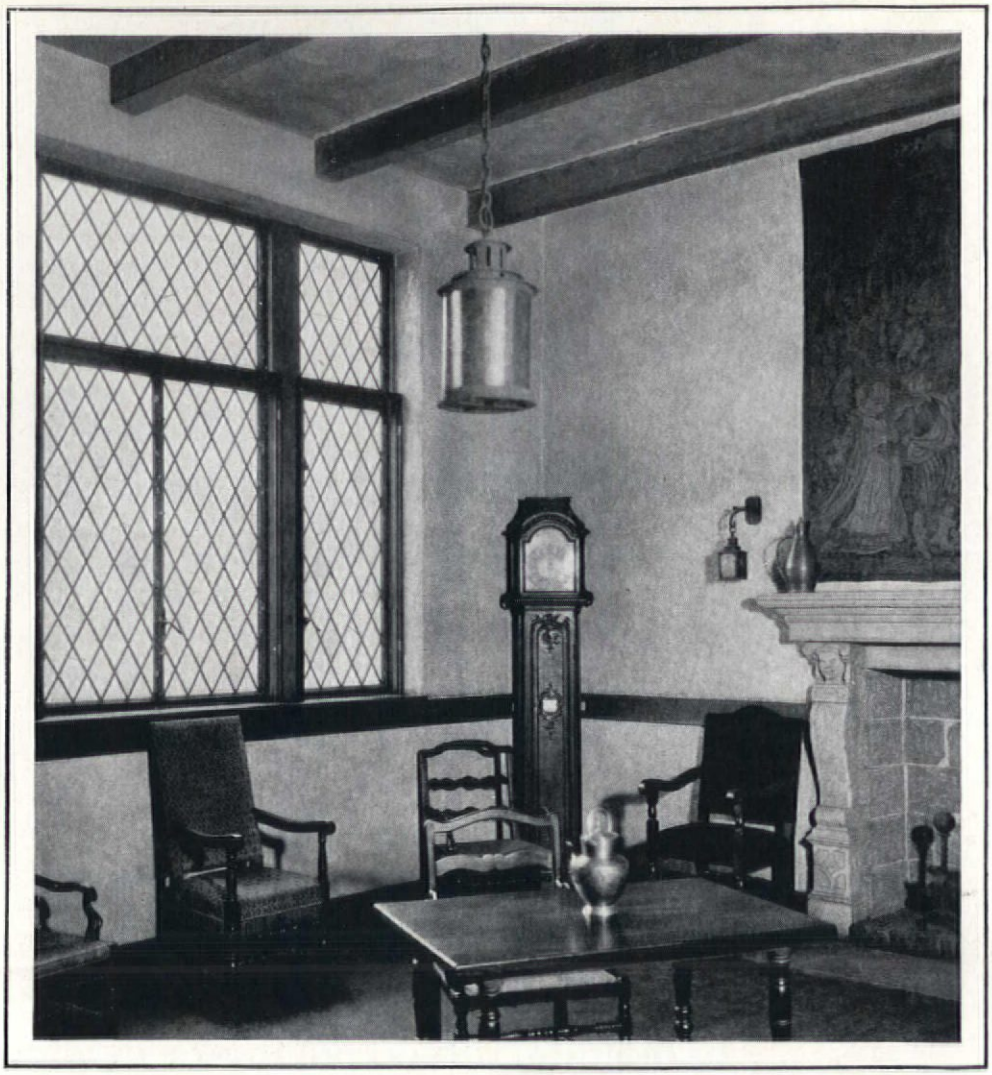




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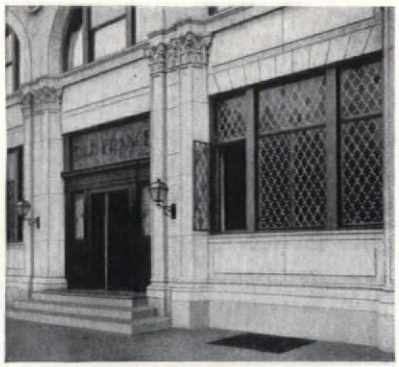


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"Old France"

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"Old France"—a Childs Restaurant, Boston, Mass. Universal and Norman Casements. Baker and Cromwell, Architects.

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SWEET'S





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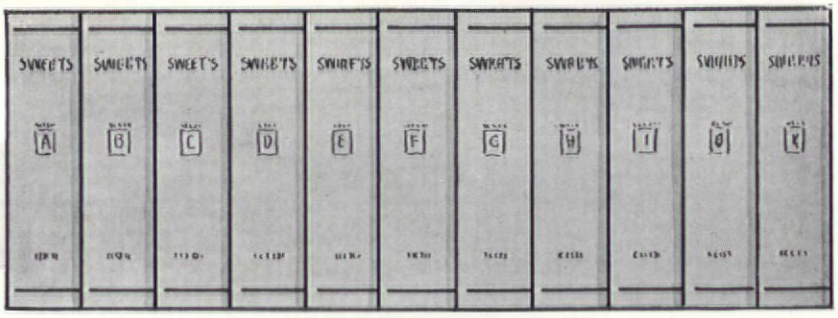
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AND TOMORROW

discard our files of loose catalogues and depend on Sweet's for everything".

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Black Carrara stiles and partitions in lavatory of New York Central Building, New York City. Warren & Wetmore, Architects. James Stewart & Co., Contractors.

PHOTO BY VICTOR KEPPLER

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Modern Structural Glass

Typical of the Research Studies

appearing monthly in The RECORD is the article in this issue, entitled "The Problem of Making Brick Walls Watertight; also, Theatre Auditorium Planning, Lighting, Acoustics, and Construction."

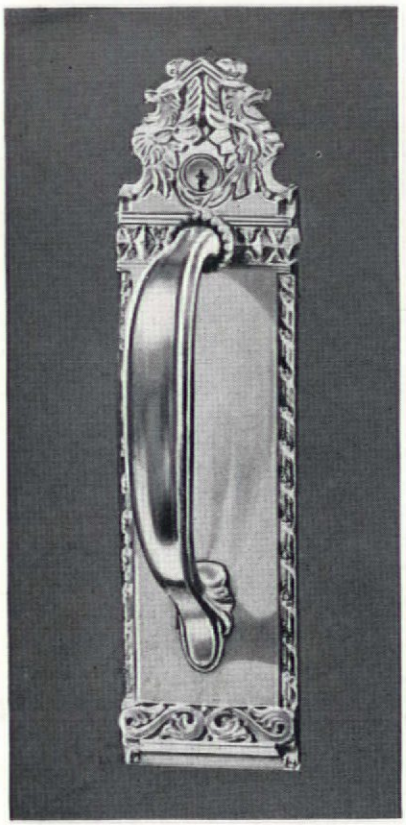
FIRST PRIZE

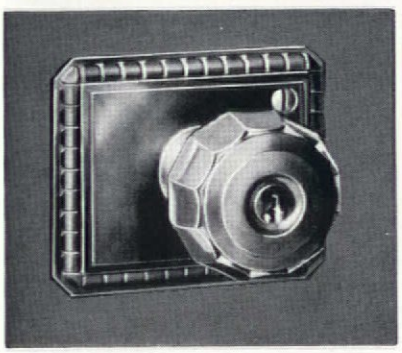
in the A.B.P., Inc. awards for Editorial Excellence under the classification "Best Article, Series of Articles, or News Report," was recently conferred upon ROBERT L. DAVISON of The RECORD staff for the "Technical News and Research" series running throughout 1929. Study of the article appearing in this issue will illustrate the basis on which the jury made their award—architects appreciating the value of exhaustive research studies on specific types of construction, and manufacturers realizing that through this creative service a new avenue of contact with the members of the architectural profession has been opened to them.

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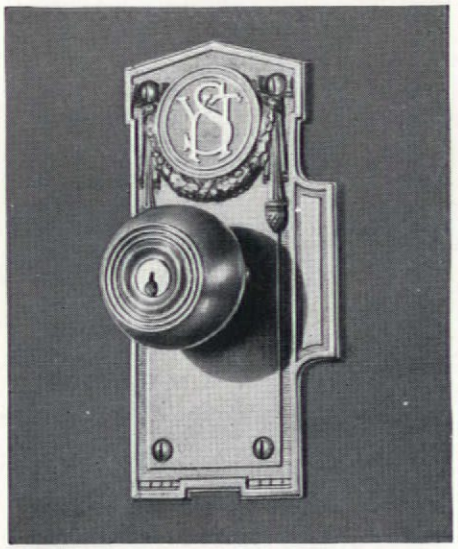
SARGENT HARDWARE

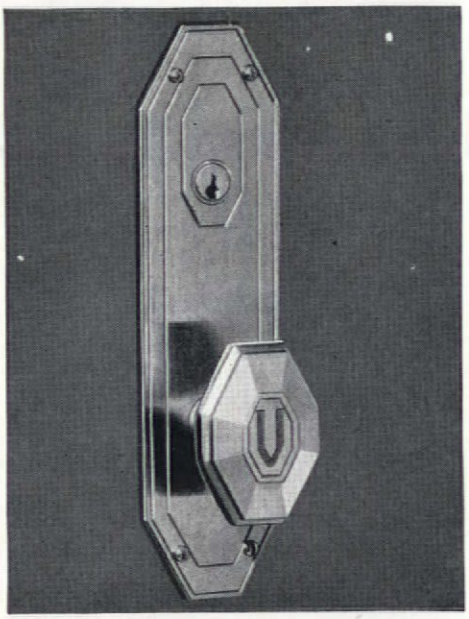




TOP. *Design for the Mayo Clinic, Rochester, Minnesota; Ellerbe & Company, architects.*

BELOW. *Sargent Union Lock, designed for the Fisher Building, Detroit; Albert Kahn, Inc., architects.*





TOP. *For the Smith-Young Tower Building, San Antonio; Atlee B. & Robert M. Ayres, architects.*

BELOW. *Design for the Union Trust Building, Detroit; Smith, Hinchman & Grylls; Donaldson & Meiers, architects.*

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DOORS FOR THIS BUILDING CUSTOM MADE BY RODDIS

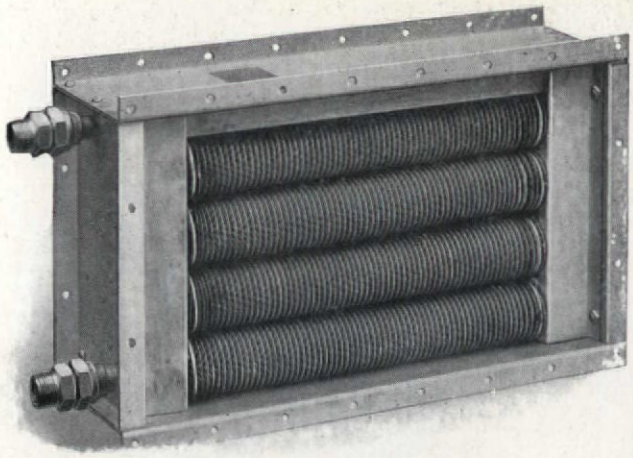
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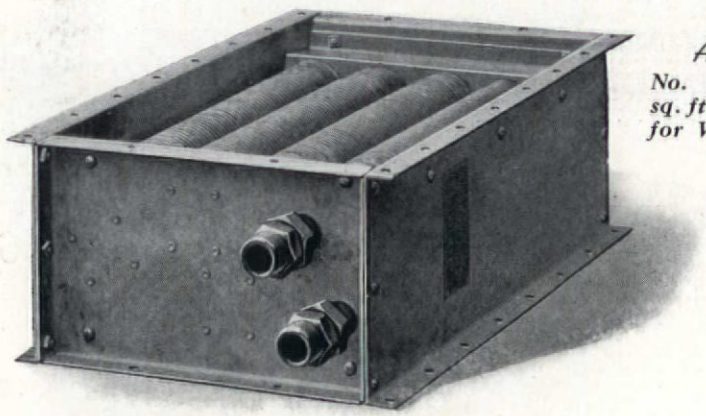


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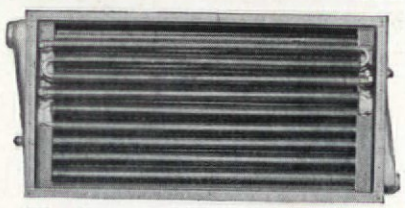
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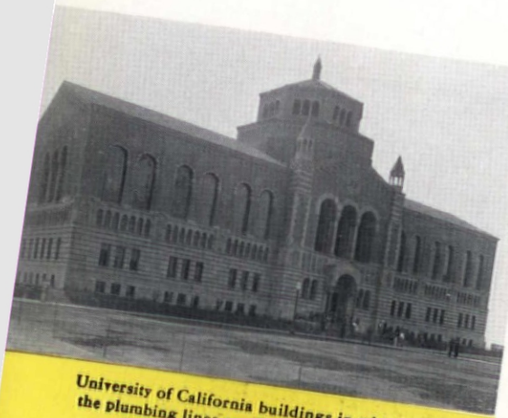
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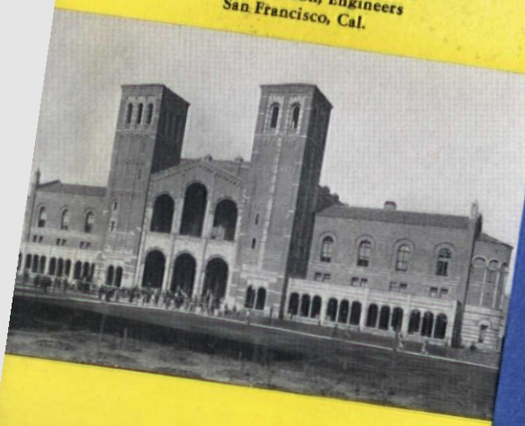
Jones Building
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Architects
Coolidge & Hodgdon
Chicago





University of California buildings in which the plumbing lines are Toncan Iron Pipe.
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Georgia Marble Similar to Parian and Pentelican Marbles

Parian and Pentelican marbles used by the Greeks have the same crystalline formation that distinguishes Georgia Marble.

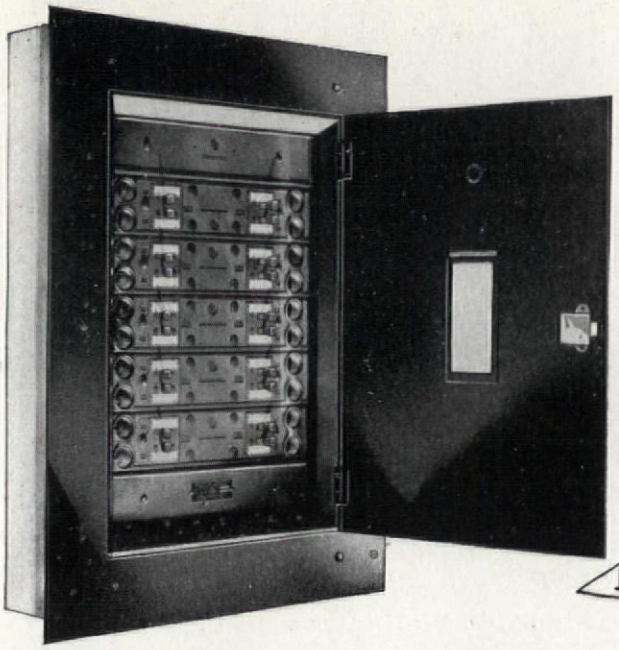
Together, these are the world's three most durable marbles; but today, Georgia Marble is the only one being produced in large quantities.



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JOHN T. WINDRIM, *Architect*

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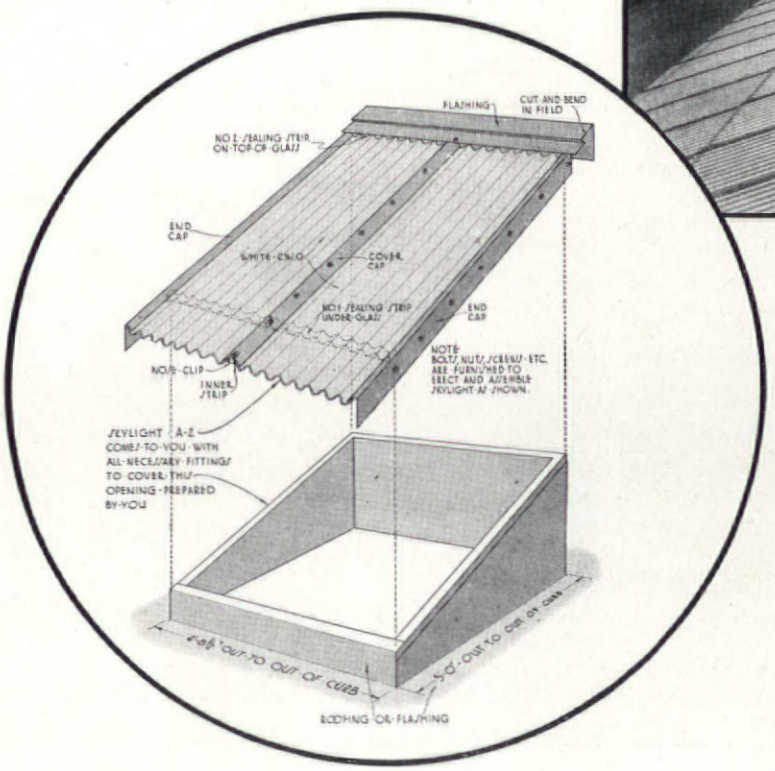
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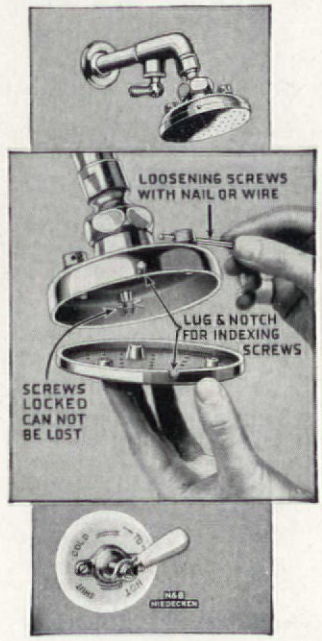
Diagram showing details of construction of skylight A-2. You prepare the opening, and we furnish everything needed to make a complete skylight.

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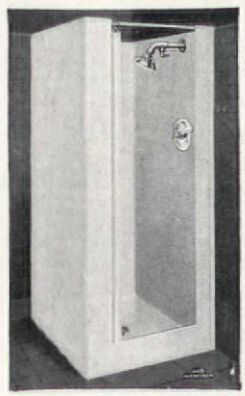
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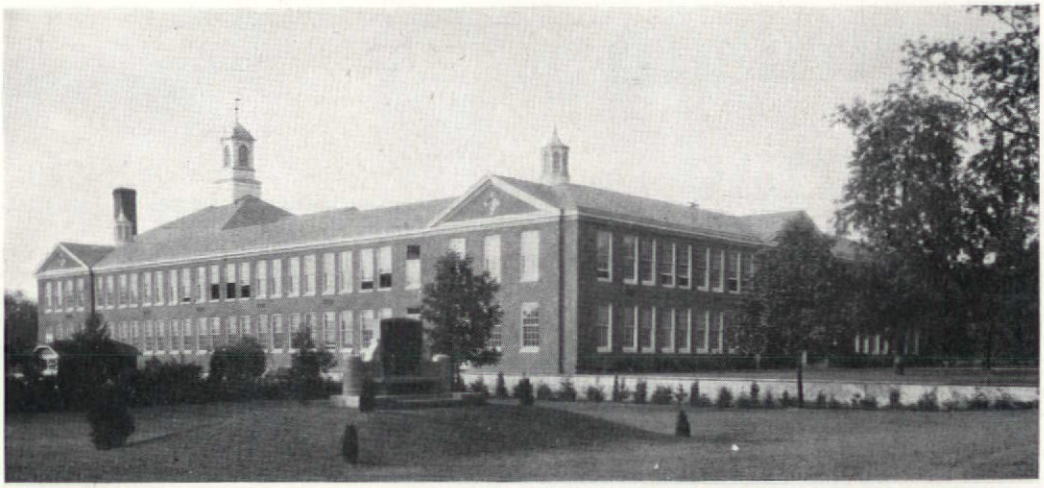
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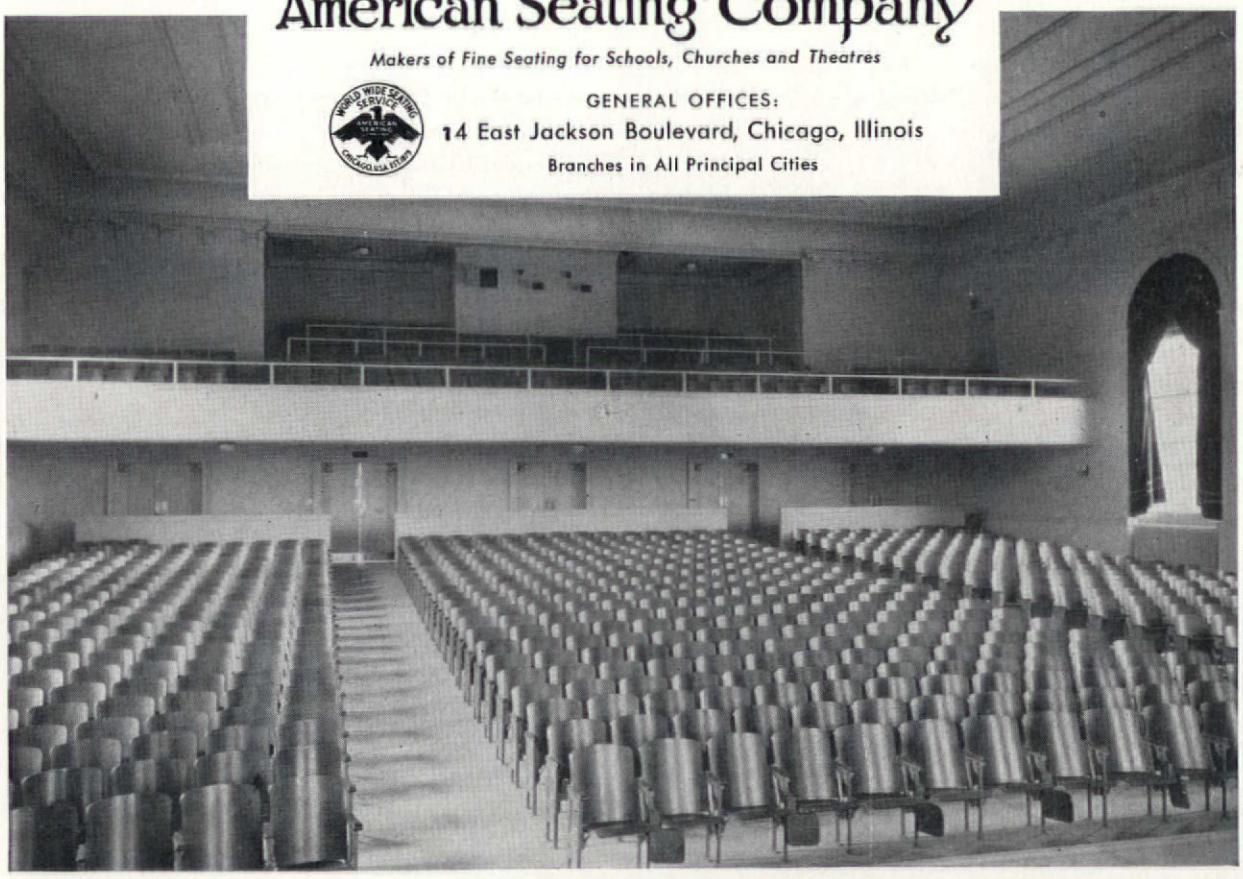
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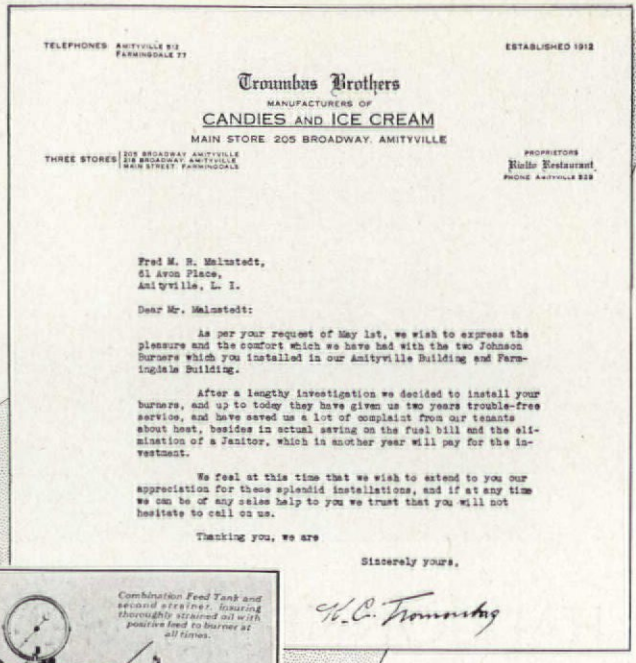
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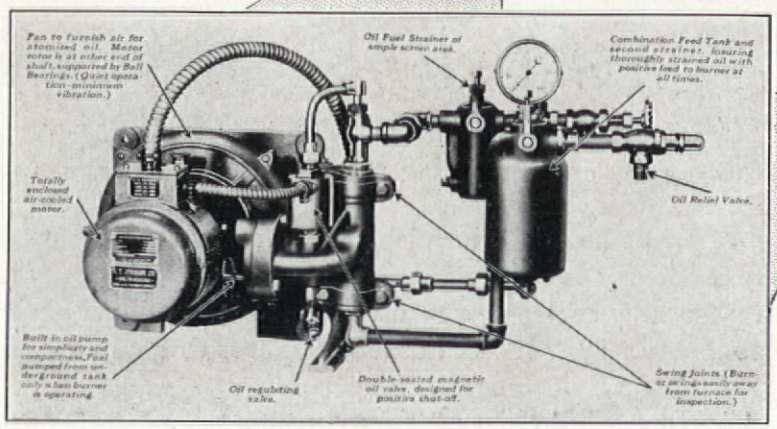
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DELANO & ALDRICH occupy a conspicuous position in the forefront of the architectural profession. Of international renown, buildings of many kinds designed by this firm are to be found from California to the battlefield of Waterloo.

The American Embassy building, about to be erected on the Place de la Concorde, in Paris, is being designed by this firm, as is the Embassy for the Imperial Japanese Government, at Washington. The American Pavilion at the International Art Exposition in Venice, a residence on the famous Belgian battleground and Dartington School, at Totnes, South Devonshire, England, are among the noteworthy foreign commissions executed by Delano & Aldrich.

Their work in this country includes the Walters Art Gallery, Baltimore, Williard Straight Hall at Cornell, Sterling Chemical Laboratory, the Sage Forestry School and several other buildings at Yale, Music School for Smith College, Northampton, Pocantico Hills residence of Mr. John D. Rockefeller, Sr., Port Washington residence of Mr. Vincent Astor, Cold Spring Harbor residence of Mr. Otto H. Kahn; bank and office building at Wall and Hanover Streets, apartment houses at 925 and 1040 Park Avenue and the Third Church of Christ, Scientist, all in New York City, the Herter residence in Santa Barbara, California, and the United States General Post Office Building, in Washington, the construction of which will start shortly.

Occupying some 15,000 square feet of floor space and employing about 70 persons, this firm does annually between eight and ten million dollars worth of work. The present year is the best in the history of the organization.

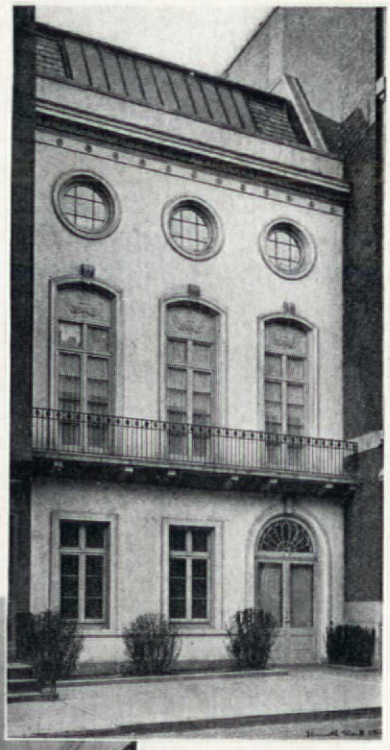
Both Mr. Delano and Mr. Aldrich are Fellows of the American Institute of Architects and Diplomés of the Ecole des Beaux Arts, in Paris.

William Adams Delano, a graduate of Yale, was an appointee of the late President Wilson at the Versailles Conference, he was also appointed by former President Coolidge, to the National Fine Arts Commission. He is a member of Secretary Mellon's Board of Architectural Consultants and of the National Capital Park and Planning Commission. He is also President of the New York Chapter of the American Institute and Chairman of the Institute Committee on Public Works.

Chester H. Aldrich, a graduate of Columbia, recently received a doctor's degree from that University. He was decorated by the Italian King following his services as Director General of Civilian Affairs, American Red Cross Commission to Italy. He has served on many juries of the Le-Brun Traveling Scholarship, the First Avenue Association, the Prix de Rome and the Beaux Arts Institute of Design.



Corner of Library in Delano and Aldrich offices. Many rare volumes on architecture are in this collection. Walls are paneled with fine old Italian oil paintings

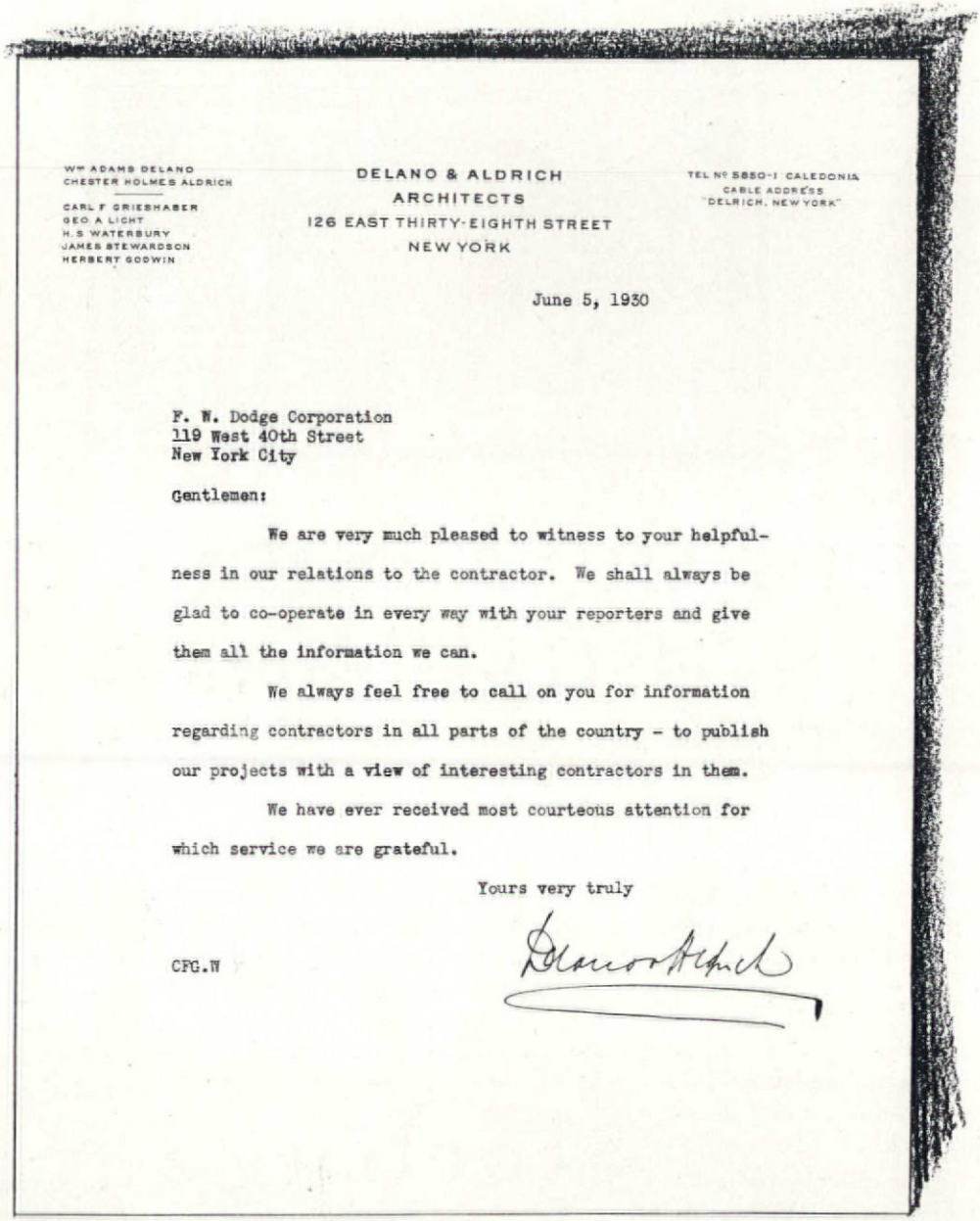


Delano & Aldrich offices are located in a building, in the Murray Hill district of New York City, that was once a stable



Entrance hall with reception rooms and library on the left; stair to executive offices at rear

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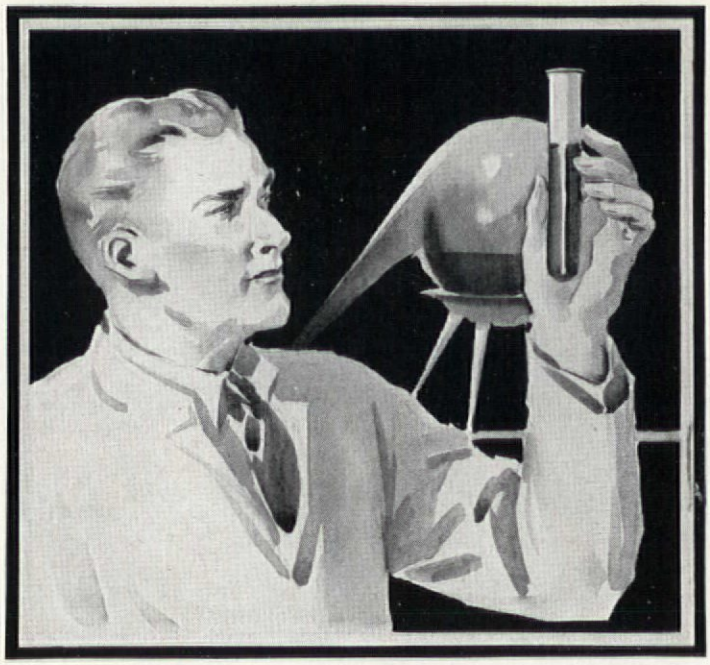
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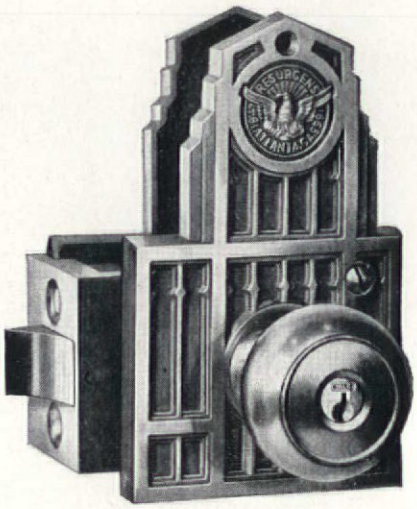
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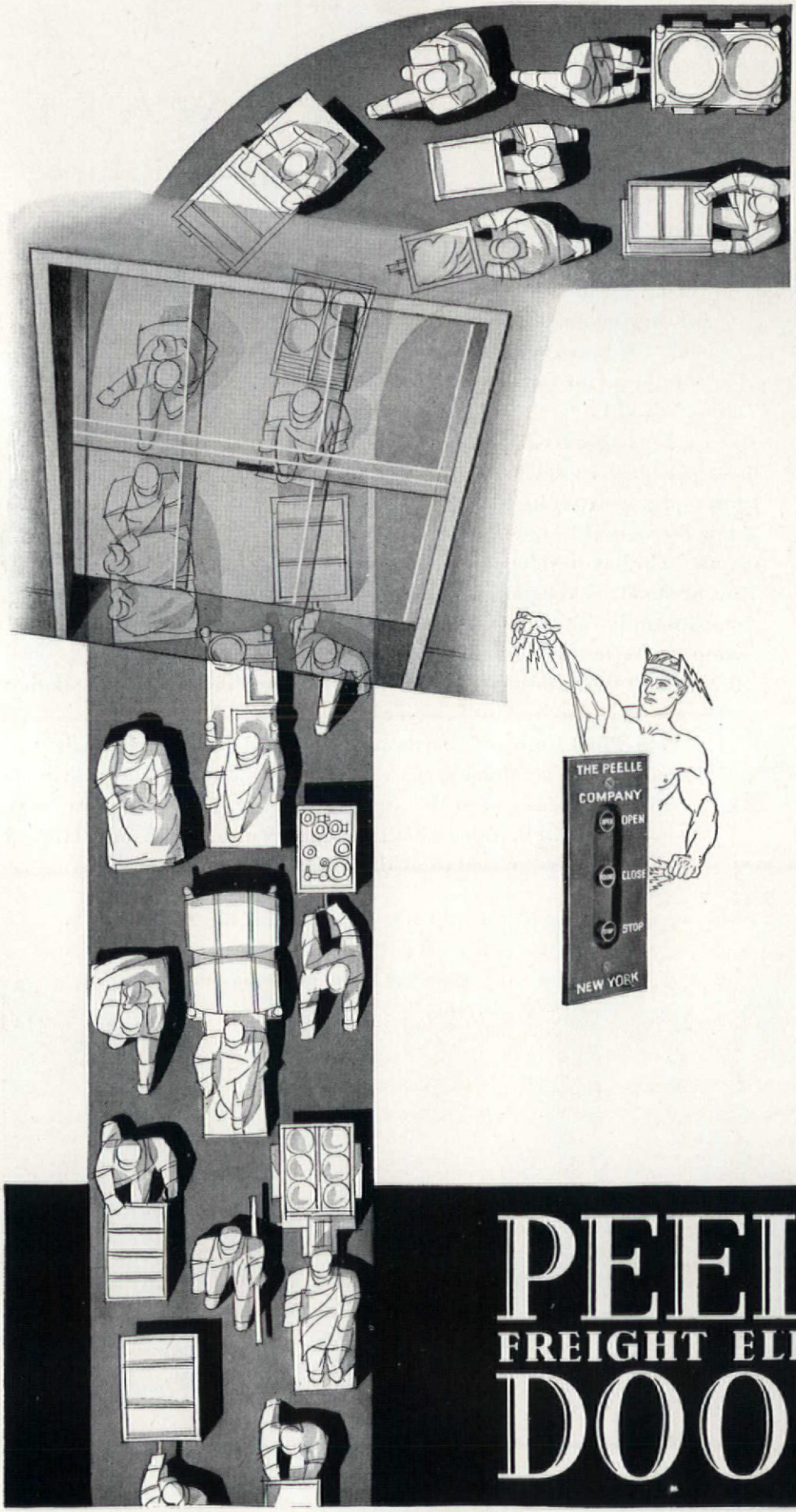
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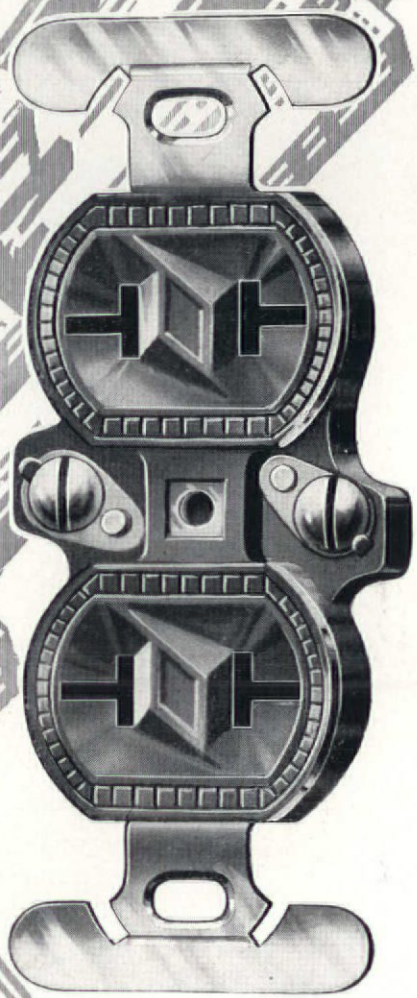
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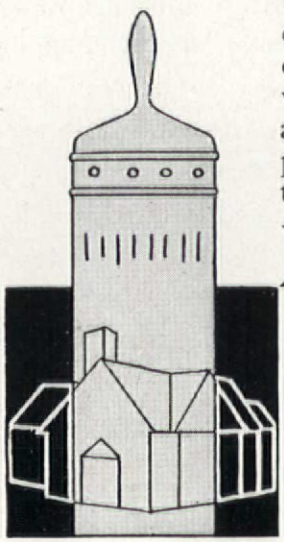
Priming with aluminum paint costs no more than "lead and oil" priming. Even when "back-priming" is added, the extra expense is trifling but the protection against moisture change in the wood is tremendous. Here are comparative figures on the house pictured above.

The original paint contract for this 10-room house called for inside and outside knot sealing with shellac, priming with lead and oil and two finish coats. The price was $1800. Before work started, the specifications were changed at the owner's request. Priming front and back of lumber with aluminum paint, made with Alcoa Albron Powder and a suitable vehicle replaced the lead and oil priming and knot spotting. The cost for this distinctly superior job was $1980—only $180 difference.

As every architect knows, the chief objection to wood as a building material is its liability to moisture change. Now it is possible to check moisture penetration in wood by priming both sides of lumber with aluminum paint. Then wood does not swell and warp. Finish coats stay on longer and look better.

Aluminum Company of America does not sell paint. But aluminum paint made with satisfactory vehicles and Alcoa Albron Powder can be purchased from most reputable paint manufacturers, jobbers and dealers. Be sure the pigment portion is Alcoa Albron and is so designated.

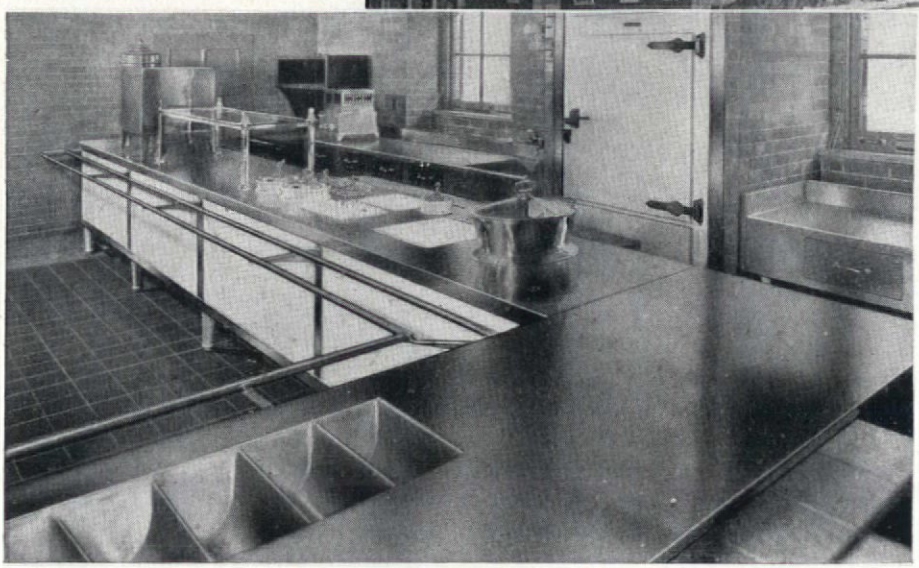
Let us send you the booklets, "Aluminum Paint, the Coat of Metal Protection" and "Specifications for Aluminum Paint". Address ALUMINUM COMPANY *of* AMERICA; 2467 Oliver Building, PITTSBURGH, PENNSYLVANIA.



ALCOA ALBRON
POWDER FOR
ALUMINUM PAINT

GLEAMING
Monel Metal





The Montefiore Hospital, Pittsburgh, Pa., has Monel Metal food service equipment, installed by THE BERNARD J. GLOEKLER COMPANY, *Pittsburgh, Pa. Architect:* SCHMIDT, GARDEN & ERICKSON, *Chicago, Ill.*

View of Nurses' Cafeteria, Montefiore Hospital. The table top, work bench, sinks, cafeteria counter trim, railings, refrigerator trim, linings, are all Monel Metal, installed by The Bernard J. Gloekler Company, Pittsburgh. In the left hand corner may be seen a Monel Metal urn manufactured by THE LYONS SANITARY URN COMPANY, *New York.*

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● Spanish tradition was closely followed by Architects Atlee B. and Robert M. Ayres in designing the residence of Dr. and Mrs. D. T. Atkinson at San Antonio, Texas. And IMPERIAL Mission Roofing Tiles played an important part in making it true to type. Above is a glimpse of the sunny patio, where the colorful roof contrasts picturesquely with tropical planting.

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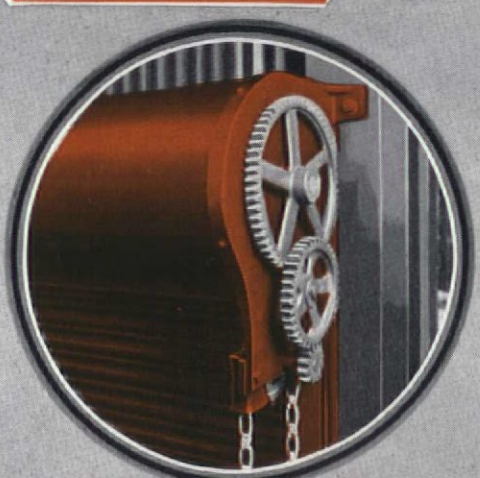
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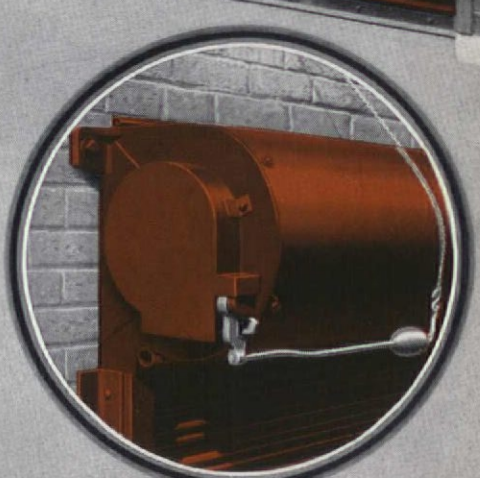
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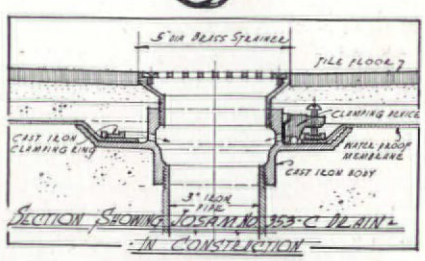
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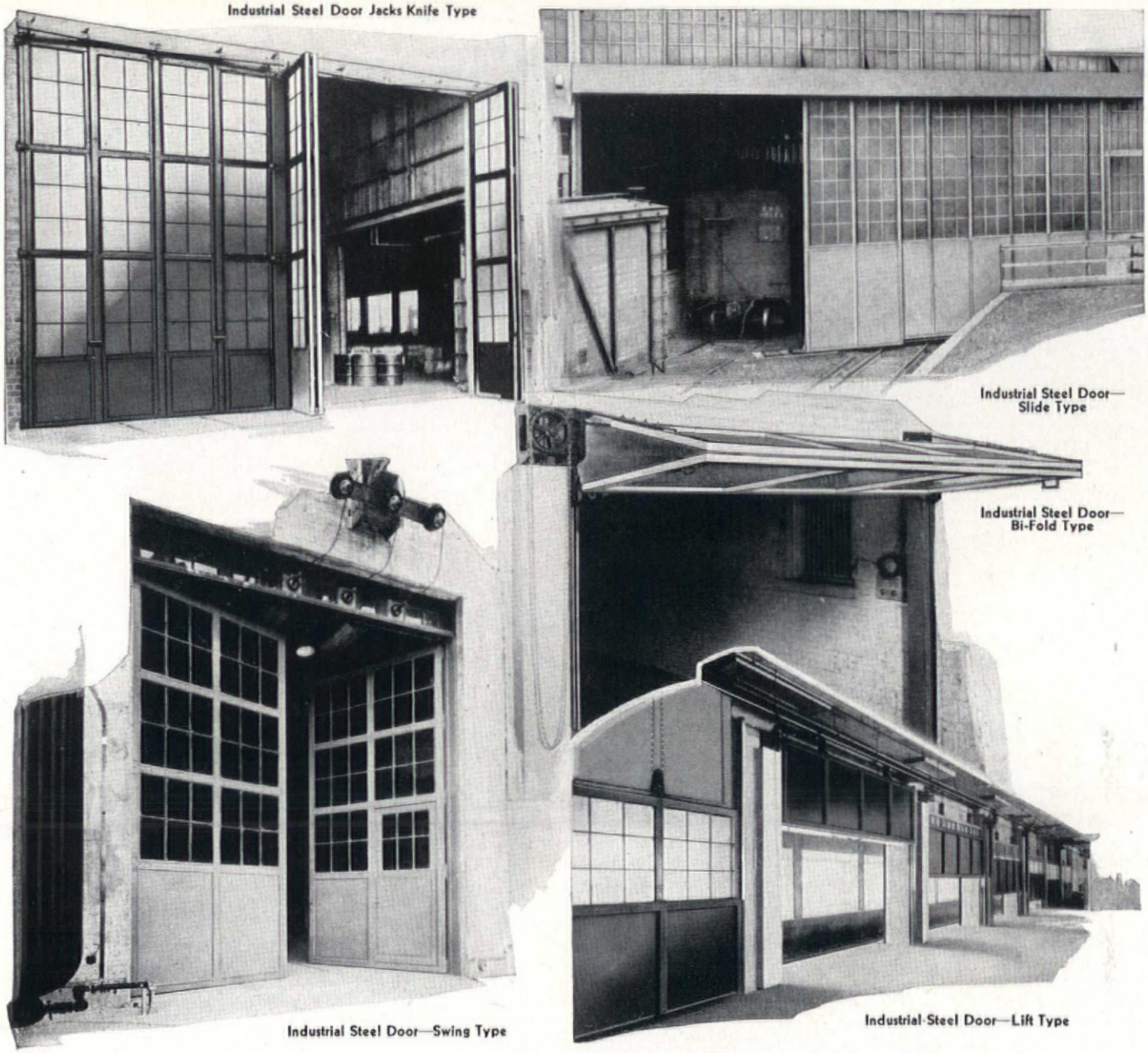


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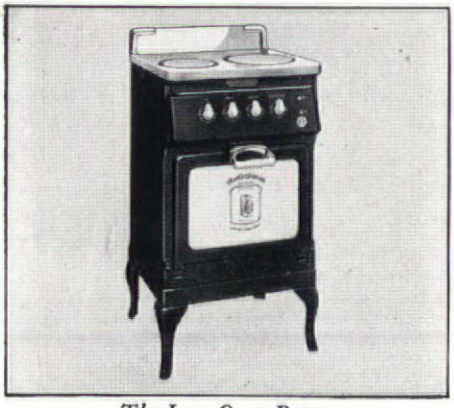
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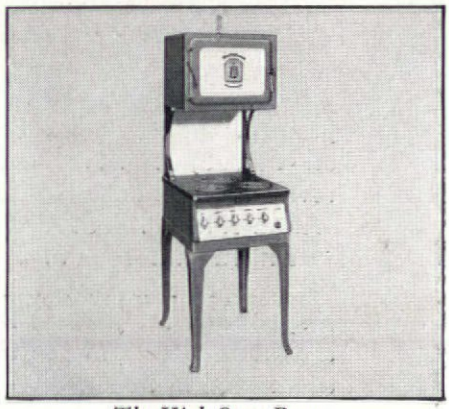
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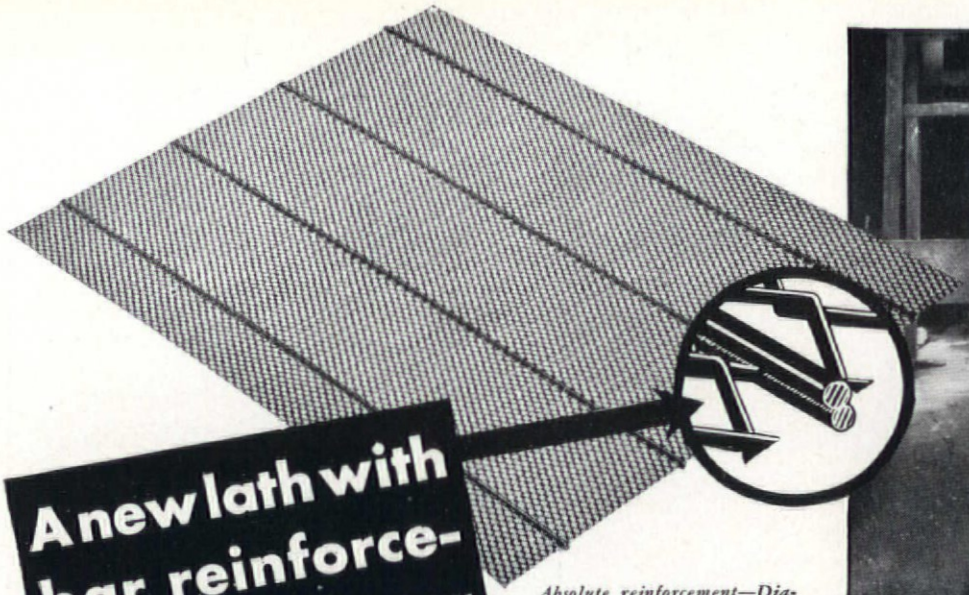
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A view of the channel side of solid partition after scratch coat. Note the wider studding made possible and absence of waste droppings.

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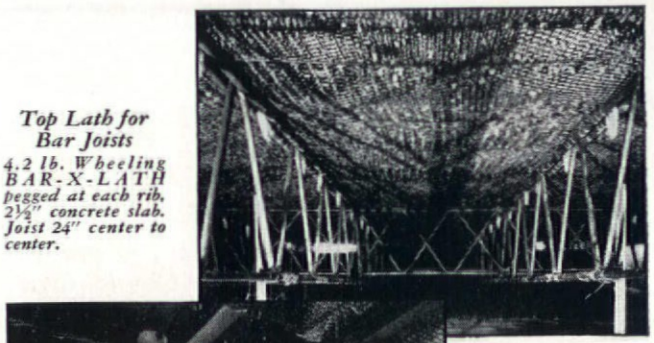
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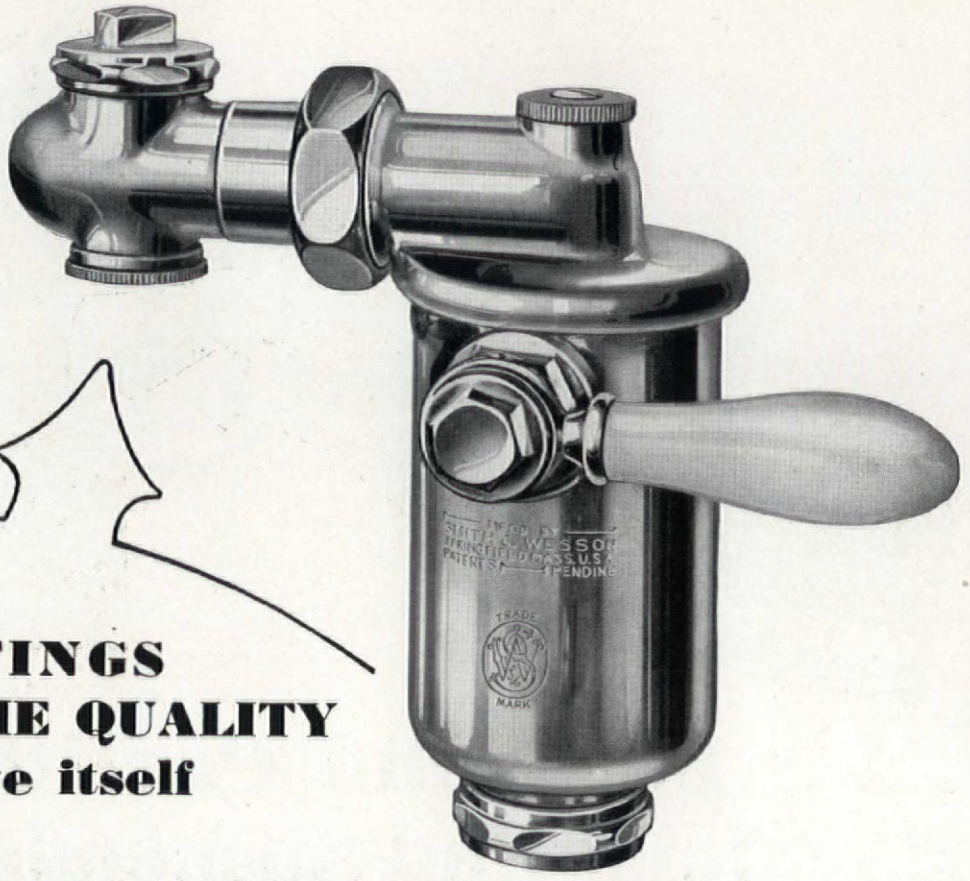
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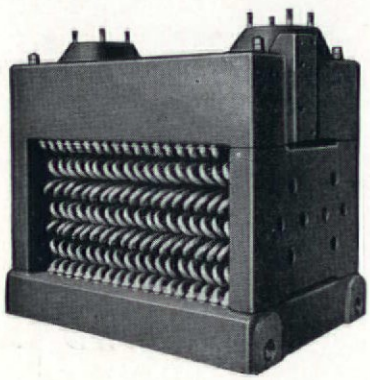
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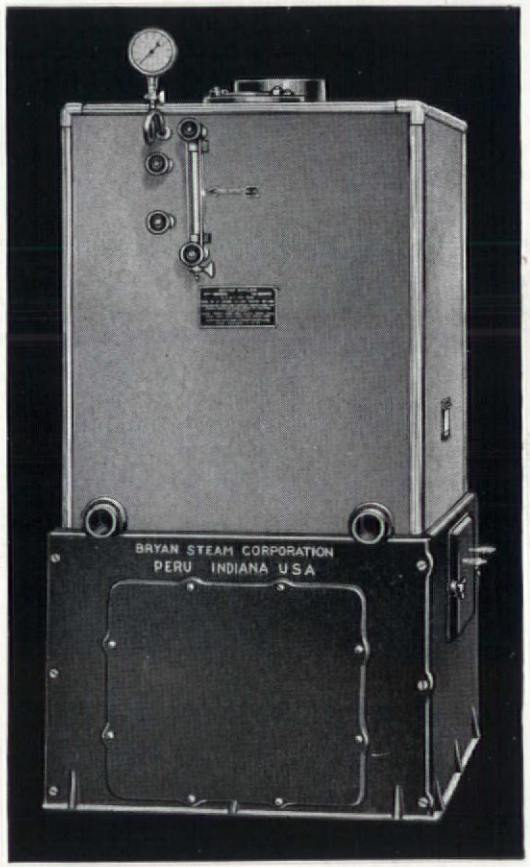
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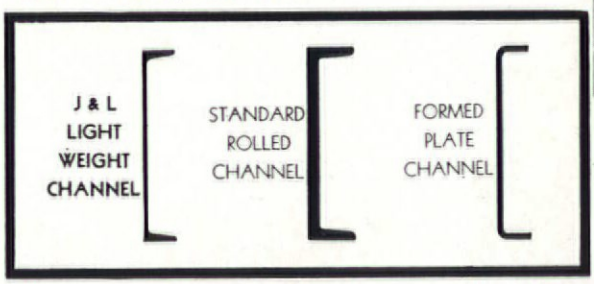
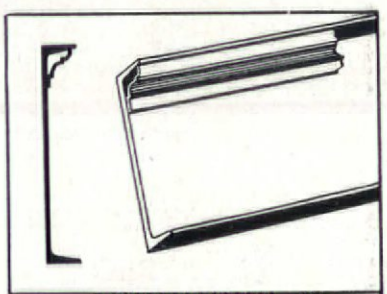
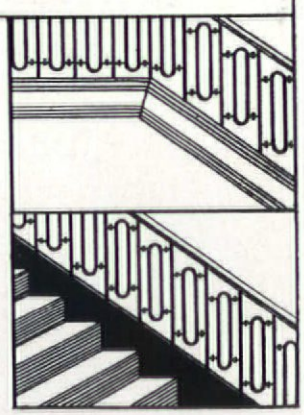


Illustration above shows comparative cross section of J & L Light Weight Channel (left); standard rolled channel (center), and formed plate channel (right). Note that J & L section provides strength, true lines and sharp corners at an appreciable saving in weight.



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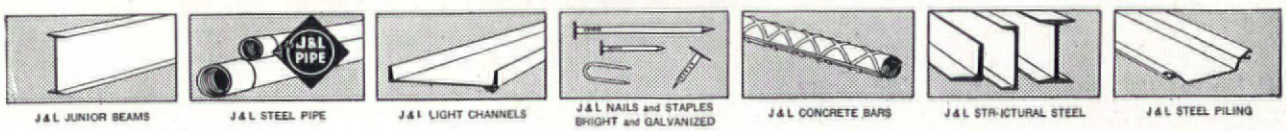
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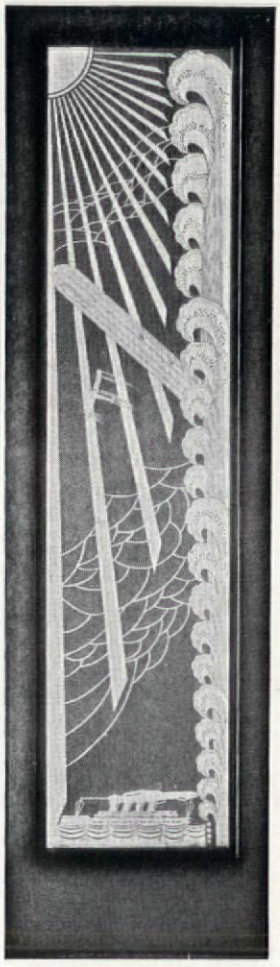
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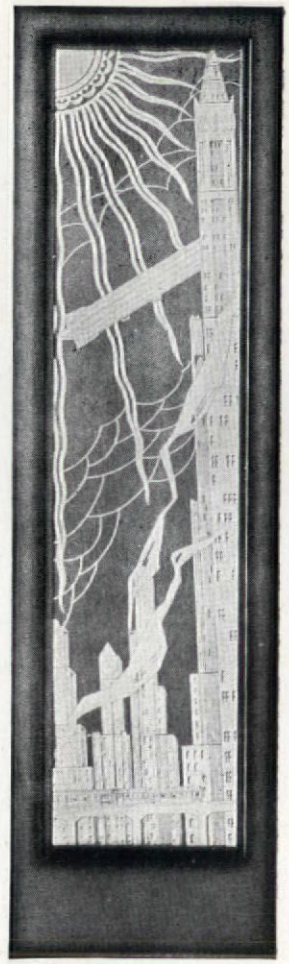
Specialists In Stainless Steel

Located in the heart of the stainless steel industry, United Metal Products Company has been closely associated with all steps in the development of this amazing material. As a result, stainless steel jobs, such as the one now in progress for the Empire State Building in New York City, go through the United plant on a production basis. All experimentation is long since past. The United organization has become known as stainless steel specialists.

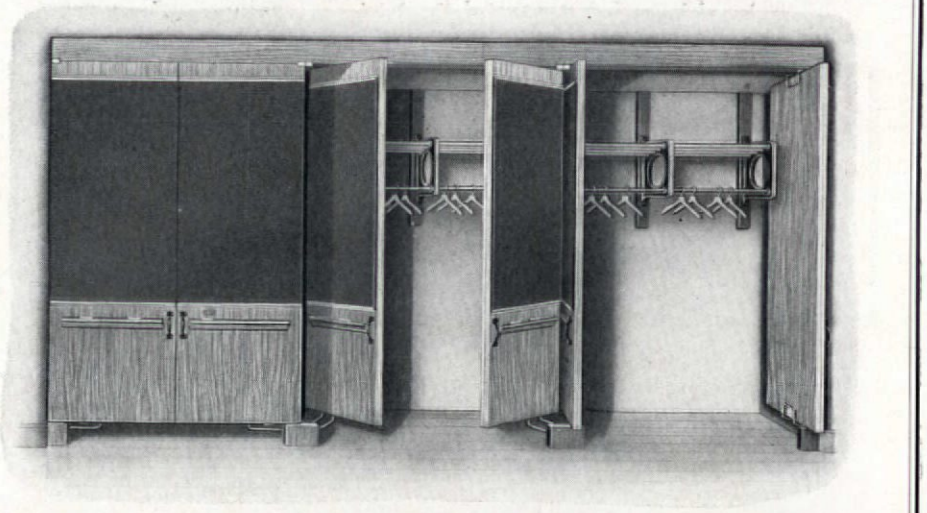
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CANTON, OHIO



Save Space *and* Increase Convenience *in* Schools *with* Evans "Vanishing Door" Wardrobes



Evans "Vanishing Door" Wardrobe Class B-B, without jambs or trim

THE wardrobe illustrated is made for plaster ends, backs and ceilings. No jambs nor trim required; only doors, fillet, hinges and garment hangers completing the installation.

The hinges used are of heavier construction than any previous manufacture and are unconditionally guaranteed to last the life of the building. There are no noisy tracks nor rollers to stick or bind, nor intricate mechanism to get out of order.

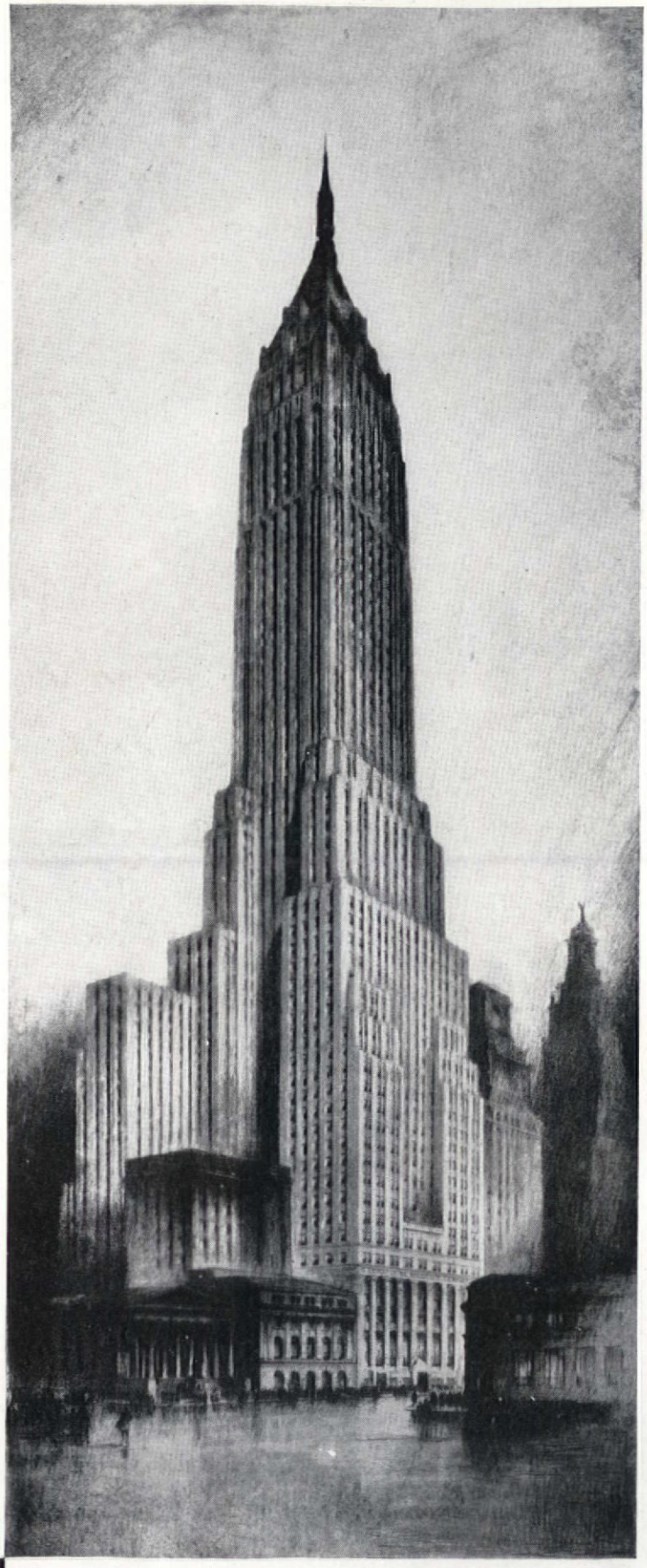
All "Vanishing Door" wardrobes are furnished complete in the knockdown. All woodwork is cut to size and only needs nailing in place. The hinges are easier to put on than common butt hinges. The cost of installation is small.

Catalog "K", of A.I.A. file size, with specifications and price list, fully illustrates many types of school wardrobes. Write for a copy.

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V A N I S H I N G D O O R W A R D R O B E S



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General Offices: Bethlehem, Pa.

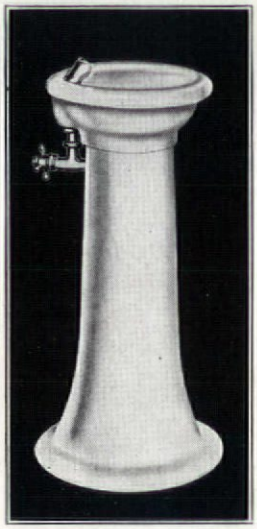
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Unlike all others it not only incorporates integrate guards, but it eliminates at the source the true cause of most contamination. It eliminates forever the unsanitary, inconvenient trickle. The Century invention automatically regulates fluctuating water pressure; and assures at all times a full, sanitary drinking stream. This bubbler does not waste a single drop of water. It has only two moving parts and is made of solid brass. Remarkable performance under actual working conditions makes it preferred above all others, especially where drinks are numbered by the thousands daily.

A new supplement to the Century Catalog fully describes this bubbler and a complete line of fountains recently approved by the City of Chicago. Write for it now.

CENTURY BRASS WORKS, Inc.

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Century SANITARY DRINKING Fountains

Fretz-Moon



Not - Just - Conduit
FRETZ-MOON Conduit

THE Architect who writes Fretz-Moon into his specifications for Conduit writes out trouble and loss of time. Jobbers carry it in stock for prompt delivery. Contractors like it for its uniformity.

Fretz-Moon Conduit bends perfectly. Its threads are always sharp and clean. The lines go in without delay. The contractor can count the dollars saved when *he makes his bid.* Fretz-Moon Conduit saves time and money for all concerned.

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Butler, Pa.

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CONDUIT



TWO ESSENTIAL TOOLS OF EFFICIENCY

Without them your client's desk equipment is incomplete

The quest for tools of efficiency with which to eliminate expense and gain expediency in business will never end.

Today, business has arrived at the point of "two phone efficiency".

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For interior communication, no system has served Industry more successfully than Strowger P-A-X—now in use in more than 2000 leading American business organizations. This automatic interior telephone system gives unfailing service, instantly, simply with a single turn or two of the dial. It renders valuable assistance to an executive in guiding his organization.

Strowger P-A-X, installed for your client as an independent automatic interior telephone system, will:

Keep rented telephones free at all times for outside calls. ¶ Reduce the number of unauthorized personal calls. ¶ Reduce telephone rentals. ¶ Enable his clients' operators to give proper attention to personal service. ¶ Provide a double track means of communication, permitting callers over his city lines to wait while information is secured over the P-A-X.

How Strowger P-A-X will fit in with any project calling for telephone equipment can be easily determined by our representative who will gladly call and make a survey of your requirements. Bulletin 1026, giving further details, will be furnished upon request.



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B. L. Marble Business Chairs have a national reputation for their high quality, their distinctiveness in design, their dependability—and their comfort features. It is this reputation that is responsible for their presence today in hundreds of banks and executive offices.

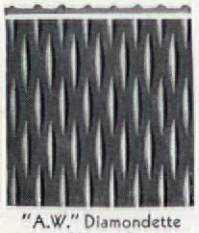


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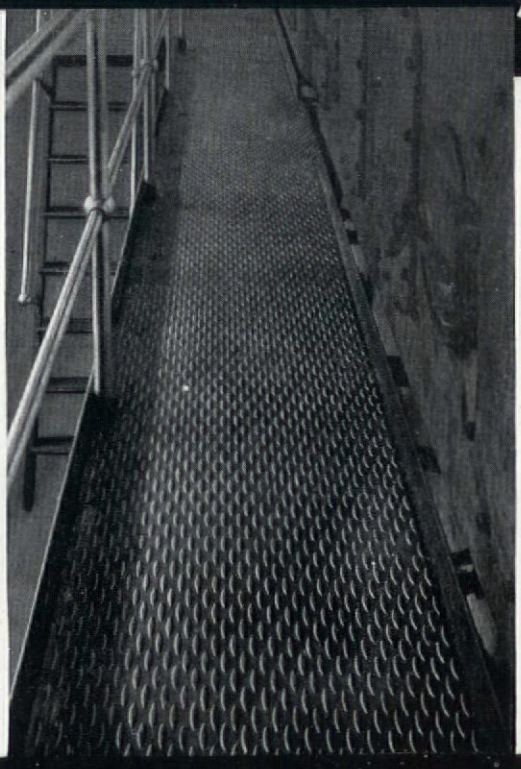
Platforms Like This Need Safe, Anti-Slip "A.W." Floor Plate



"A.W." Diamond
(¼ size)
Furnished in rolled steel (also in aluminum) and all commercially-rolled metals, in thicknesses of from ⅛" to 1".



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(¼ size)
Furnished in rolled steel (also in aluminum) and all commercially-rolled metals, in Nos. 16 to 12 Gauges, and in other thicknesses up to ⅜."



"A.W." Floor Plate makes platforms, floors and other under-foot surfaces non-slipping and safe. The raised diamond pattern gives traction and anti-slip qualities at all times. The round-top, oval-shape diamonds are spaced and proportioned so that feet get a firm, sure foothold.

"A.W." Floor Plate is also self-draining from every angle, as the raised pattern has no flat surfaces to accumulate oil, water or refuse. This is an additional safeguard against slips and falls.

Samples of "A.W." Floor Plate, with interesting booklets, gladly sent on request. Write us.

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"A.W." Diamond Pattern Rolled Steel FLOOR PLATE



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Wright Rubber Products Co.
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Rubber Only Material That Withstands Tire Road Wear

Says England...
"Use this cream white cedar for cabinet work"



For this fine cabinet work, Roland Coate, Los Angeles architect, selected Port Orford Cedar. Kitchen of the Jacob Stern residence, Beverly Hills, California.



Spacious Port Orford Cedar linen closets of the M. A. Harris home, Atherton, Calif. Ward & Blohme, San Francisco, architects.

"PORT ORFORD CEDAR *should be more largely used for cabinet work*" declare Berner & Wilson, of London. Smeaton & Hanscomb, also of London, highly recommend this wood.

Proof of its exceptional merits abounds in the many British buildings entirely finished in Port Orford Cedar: Victoria Infirmary, Royal Infirmary, Union Bank of Scotland, North British Mercantile Insurance Co., Ltd., Gleneagles Hotel, Perthshire, Scotland. It is often used for beams and paneling in the larger private homes. British ship builders use it in staterooms of first class passenger liners.

In America this fine wood is rapidly winning the respect of outstanding architects. Smooth, finely grained, it responds to enamels with a beautiful, enduring luster. Needs no unusual priming coat. Never blisters or crinkles.

Port Orford Cedar stains easily to true, even, warm stains since there is no inherent color in the wood to be overcome. This wood works easily. Is light and pliable; does not splinter or check and holds nails with unusual tenacity.

Sound as a dollar in soils, sea or acids

Port Orford Cedar is the favored wood for many outdoor uses because of its exceptional resistance to decay: entrances, porch columns, garden furniture. Of great strength, it is without superior for bulkheading, tunneling, decking, boat building. Acid proof, it is used in over 90% of the world's storage batteries.

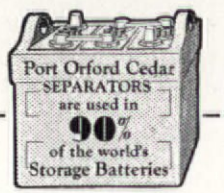
Your local lumber dealer and millwork house has Port Orford Cedar lumber and plywood or can supply all standard grades and sizes promptly.

The coupon brings post haste complete information about this fine wood. Mail it today.

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The Aristocrat of Woods



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OF DEAD AIR, DRAFTS, DUST AND NOISE FROM THE STREET!

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Just step into this modern courtroom. Here the air is always refreshing, always at the right temperature. Windows are closed... there are no drafts, no noise and dust from the street. Proceedings are not hampered by the depressing effects of bad air.

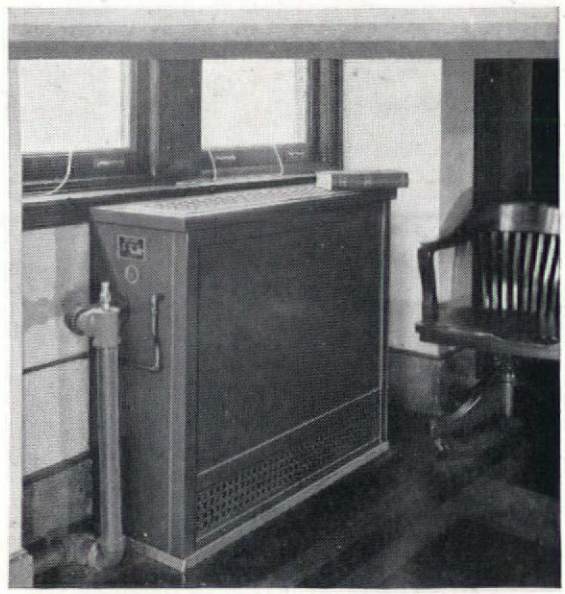
There are 17 Sturtevant Unit Heater-Ventilators in the courtrooms, libraries, and complaint rooms. These units bring in outdoor air, filter it, temper it... then pass it gently into the rooms. They are quiet, automatic, and finished to blend in with the rich oak woodwork.

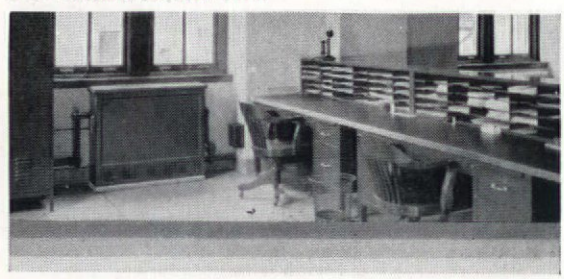
Sturtevant Unit Heater-Ventilators are adaptable to a wide variety of installations in schools, churches, institutions, office buildings, etc. You will be interested in our Catalog 361... and it will be a pleasure to send you a copy.

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Above, a corner of a library; *below,* the traffic complaint room, in the Washington Heights Court House, New York City; *Architect:* George M. McCable, New York; *Engineer:* J. P. Whiskeman, New York; *General Contractor.* Jas. McWilliam, Inc., New York; *Heating Contractor:* Dierks Heating Co., New York.

Sturtevant Unit Heater-Ventilator

Reg. U. S. Pat. Off.

SUPPLIES OUTDOOR AIR ∾ FILTERED CLEAN ∾ AND TEMPERED



Do YOU *do as the* ROMANS *did?*

▼ *— or will you supply a little Jupiter Pluvius all of your own?*

The Romans had beautiful gardens if Jupiter Pluvius remained in bad temper during the summer. When he was angry he rained . . . or so they thought.

Modern architects know a better substitute for Jupiter Pluvius. They would rather not allow this ill-tempered deity to ruin their plans for a beautiful ground by withholding moisture. More and more, Thompson Concealed Lawn Sprinkling Systems are specified in the architect's plans.

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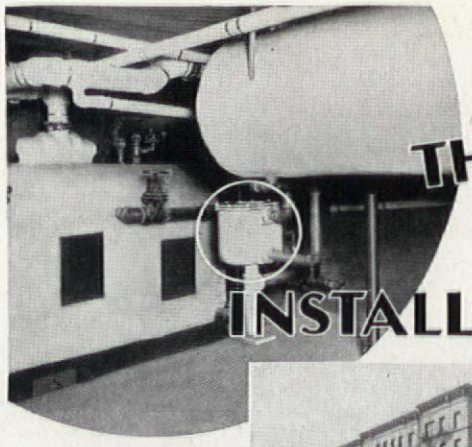
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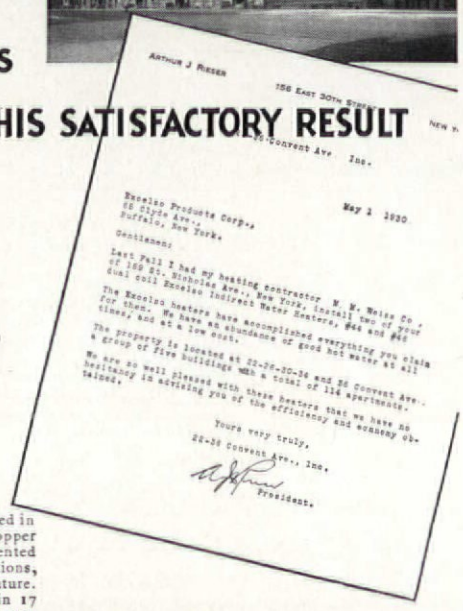
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PRODUCED THIS SATISFACTORY RESULT





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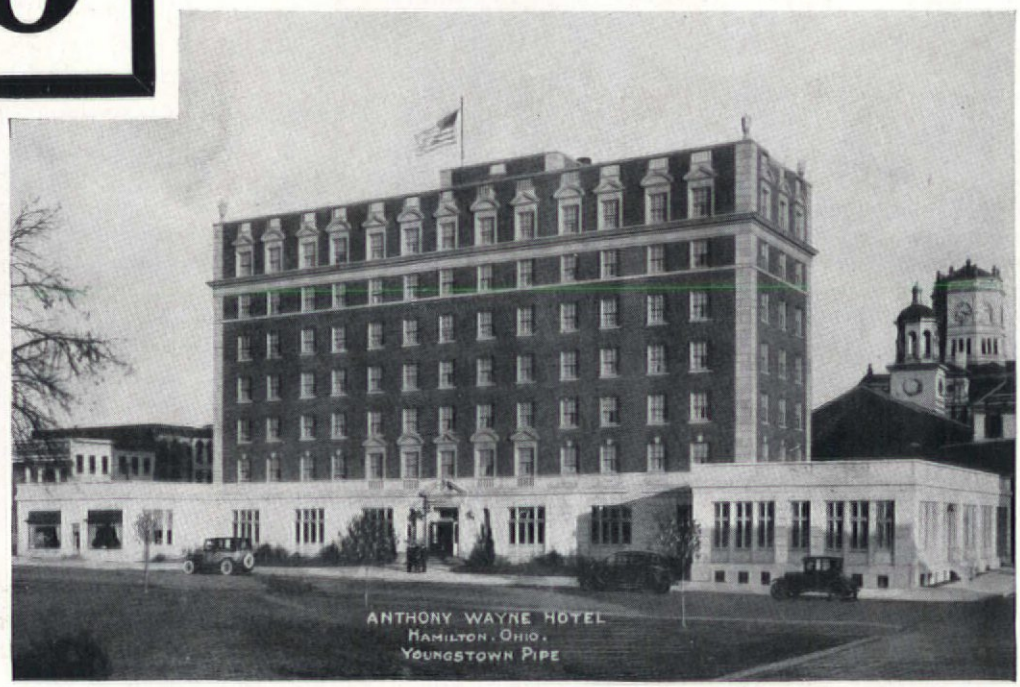
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—higher efficiency —lower installation costs —with RIC-WIL



After trench is graded, lay Ric-wiL Base Drain end to end like dominoes —the center bead serves as an alignment guide. Wedge Pipe Support saddles between every sixth section.



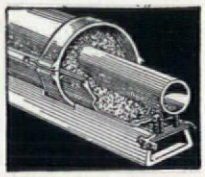
Set on bottom conduit section—every sixth section has a pipe support hole. Install and test the pipes—exceptionally easy, as pipes are in the open.



Pack Dry-paC Filler around pipes, put top conduit section in place, cement bells and Loc-liP Side Joints. Job is ready to backfill.

RIC-WIL CONDUIT, with RIC-WIL Base Drain, is quickly and economically installed. It eliminates a subtrench, hand-curving the bottom of trench and digging out for bells. It eliminates the necessity of reinforced concrete field construction and it can be installed rain or shine—thus avoiding delays. And you only handle three pieces to each two feet of conduit.

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Insulation may be any of four types, but Ric-wiL Dry-paC waterproof filler is by far the most effective. Dry-paC stays firmly around the pipes under all conditions. Repeated tests of Ric-wiL insulations using Dry-paC filler show from 92% to 94% efficiency—well over the guaranteed 90%.

Ric-wiL Engineering Service can help you. Feel free to write us for further information.

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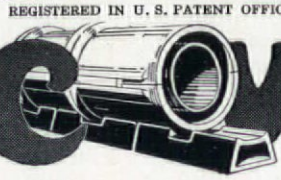
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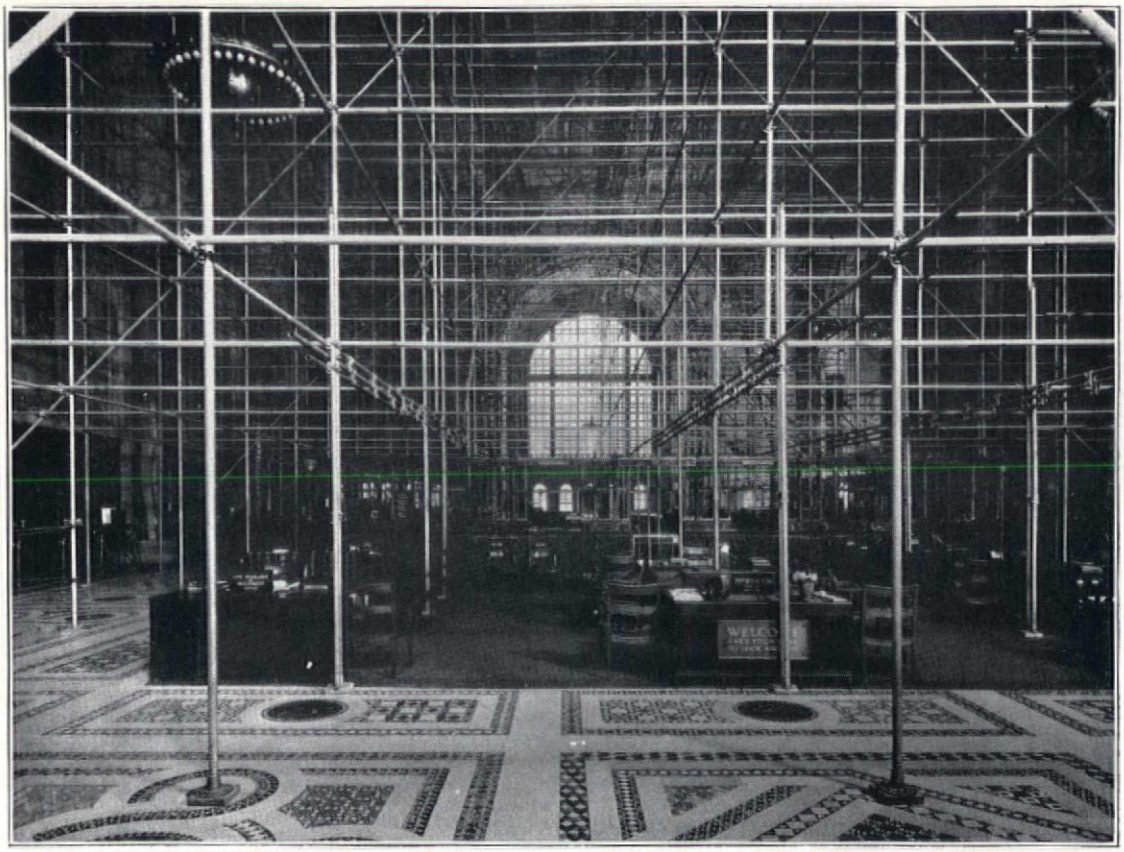
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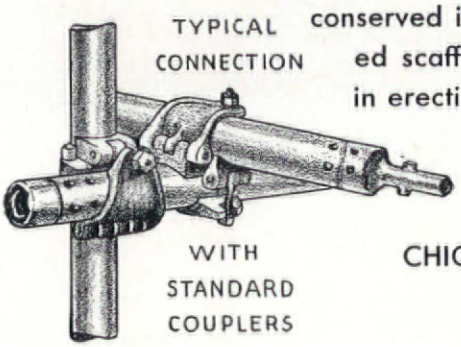
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TUBELOX
PATENT TUBULAR STEEL SCAFFOLDING

Can Be Rented by the Job, or Bought for Regular Use, as Conditions Warrant.



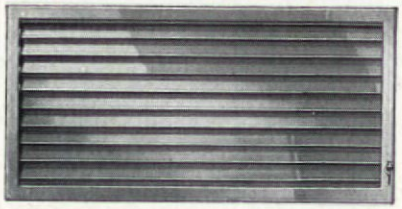
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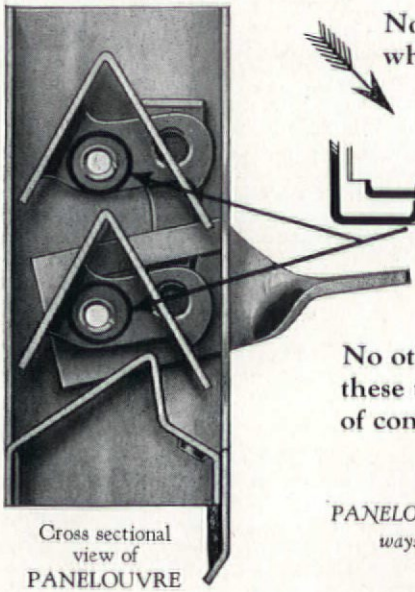
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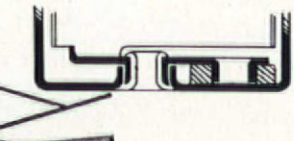


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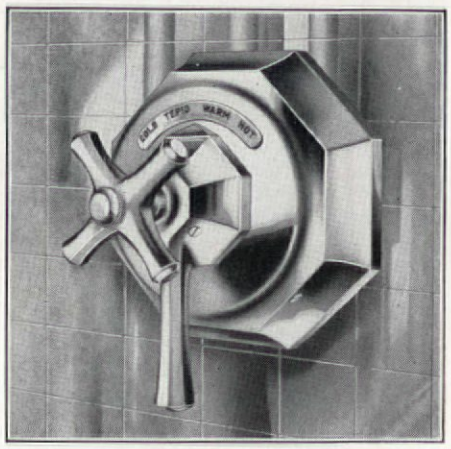
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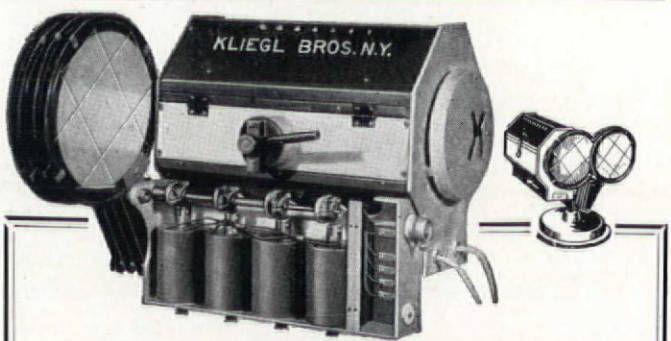
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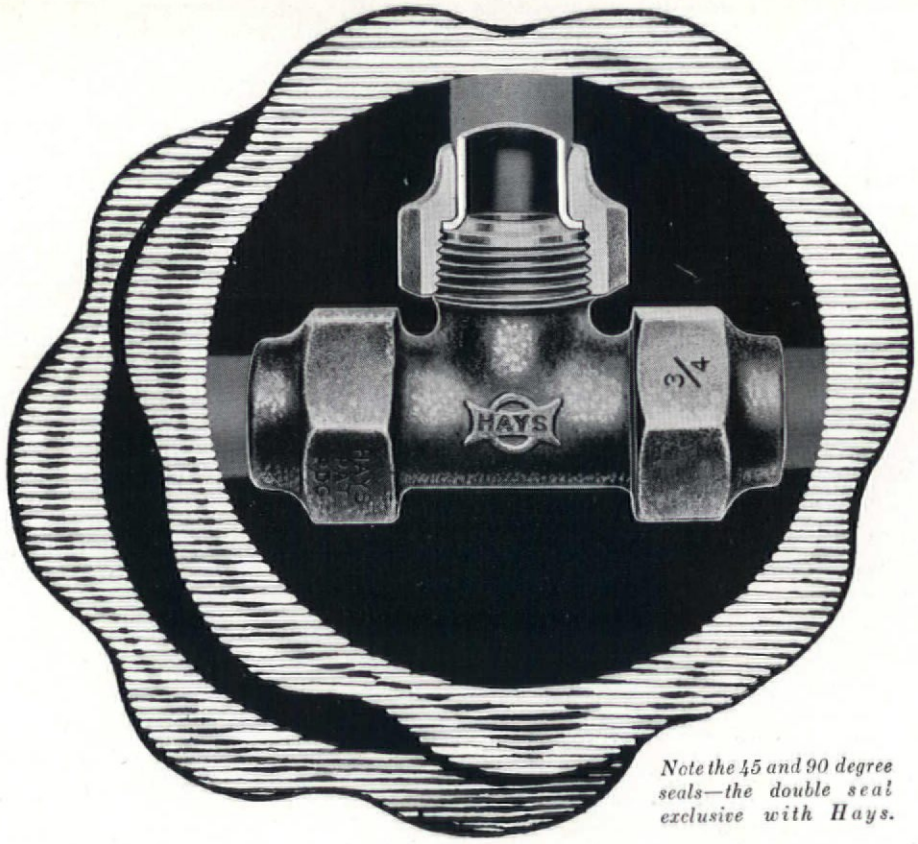
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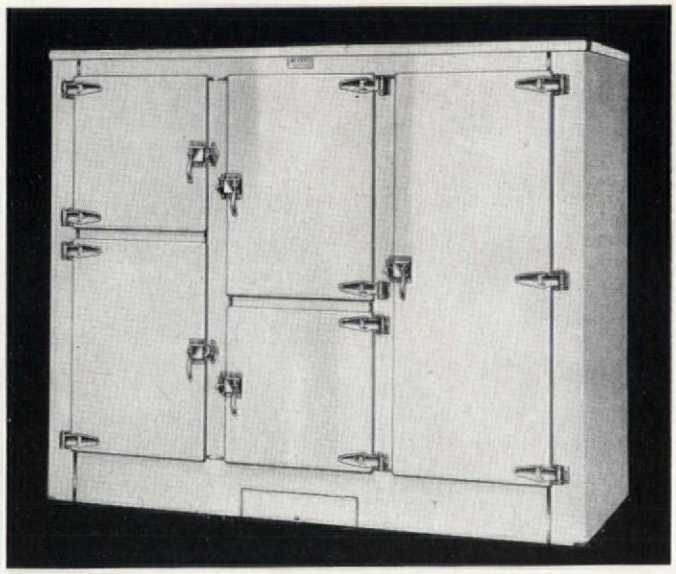
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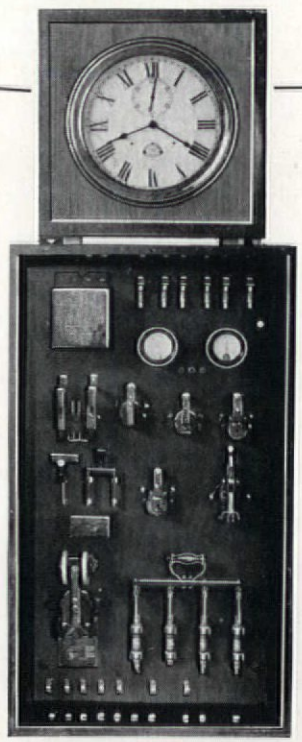


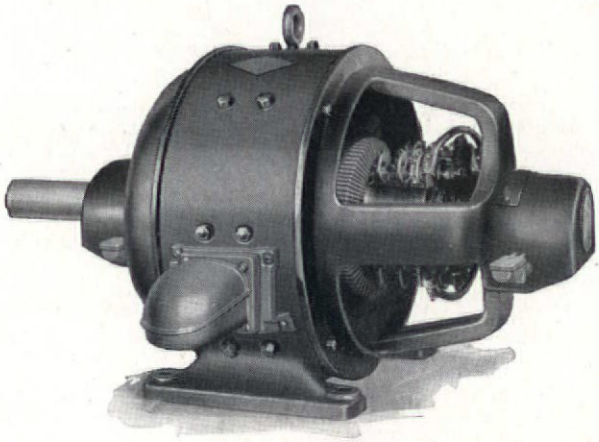
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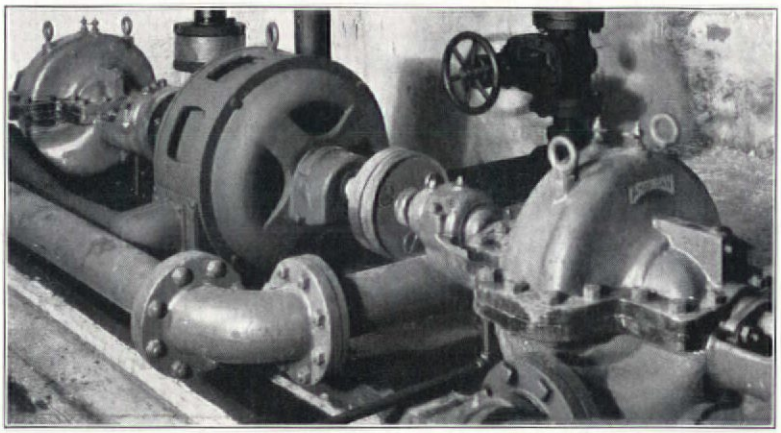
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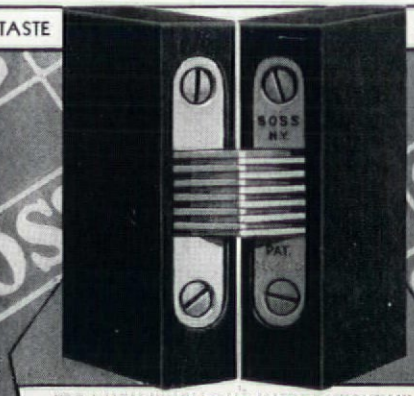
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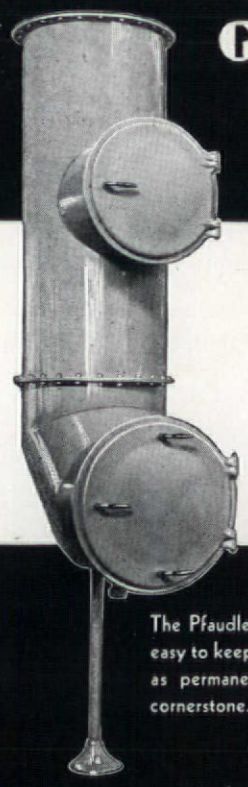
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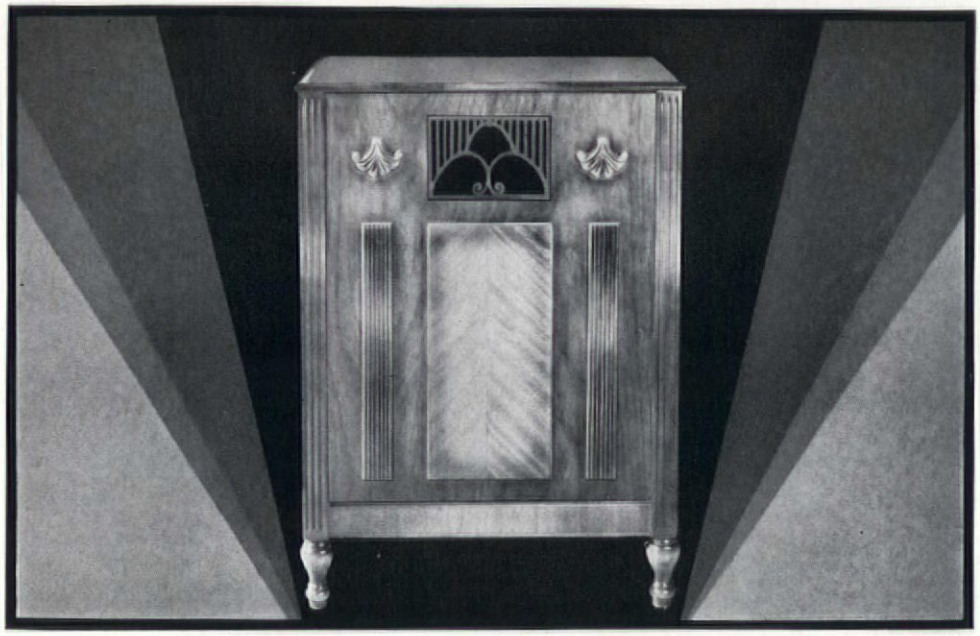
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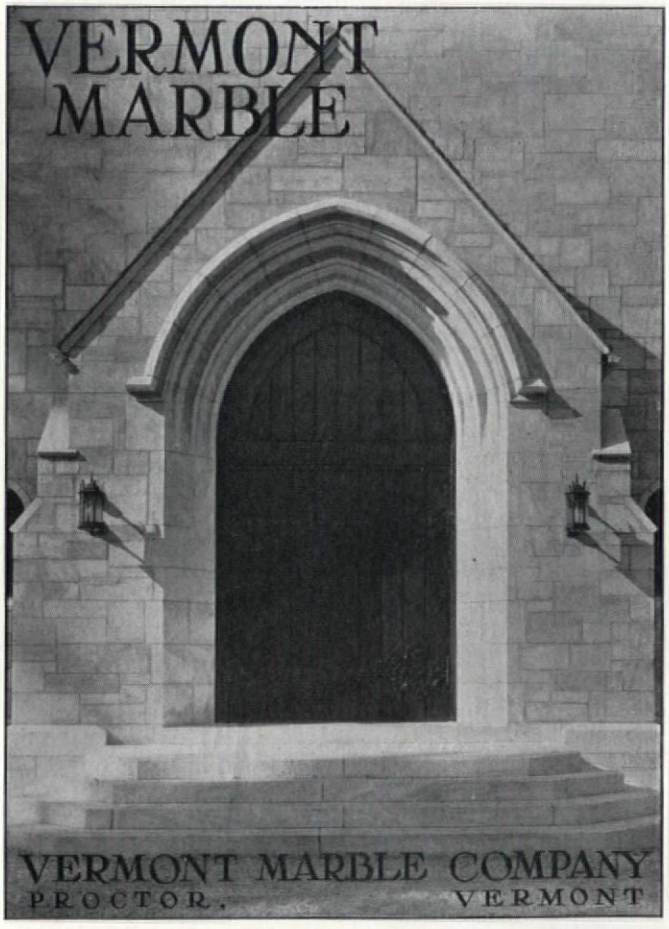
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Figure 237
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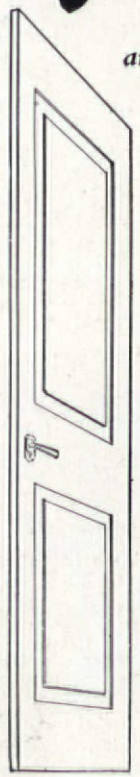
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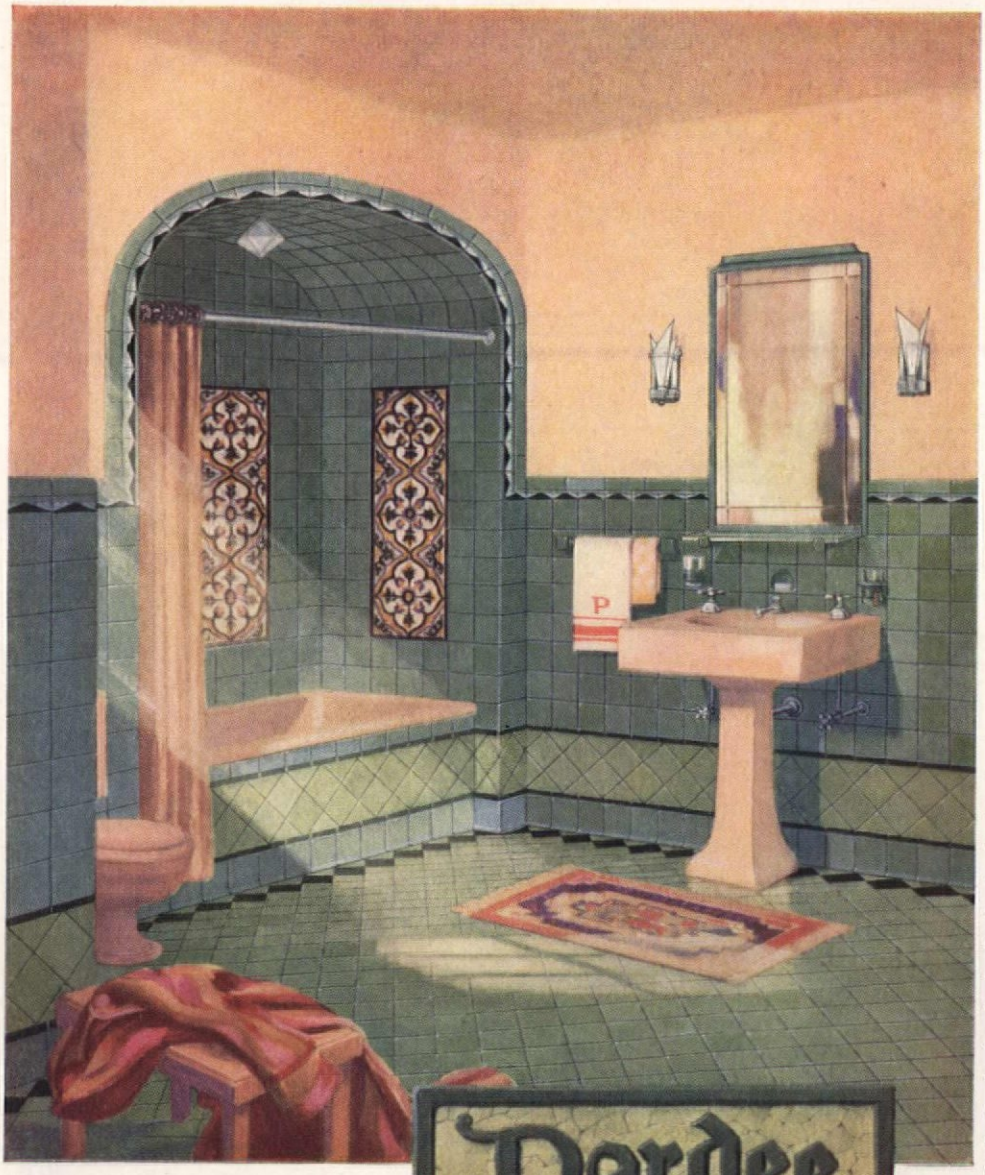
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AUTHENTIC PLASTER ORNAMENT



JOHN EBERSON, *Architect*

Reproduction of Spanish XVIth Century Ceiling

Among the best preserved of the old Spanish convents is the Convento de San Marcos at Leon built during the XVIth Century. It is justly famous for its ornamental ceilings of which this one, found in the main hall, is a notable example.

The extreme richness of detail is characteristic of the period and entirely in keeping with the Spanish furniture and wall hangings of this same era. The ceiling is pictured above as reproduced with startling effect by Jacobson in the New York offices of Mr. John Eberson.

The new Jacobson catalogue, comprising 3109 new designs never before published, is now ready for distribution to recognized architects and decorators. If you have not already done so, please write to make sure that your copy is forwarded promptly. A catalogue of Modern Ornament is in course of preparation.

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ARCHITECTS' ANNOUNCEMENTS

and Notes in Brief

CALENDAR OF EVENTS
GENERAL ANNOUNCEMENTS

May 20-Oct. 1	Exhibition of modern Architecture and Industrial Arts at Stockholm, Sweden.
July	The German *Werkbund* Exhibition at the Grand Palais in Paris. Exhibition of modern furniture, steel apartment house layouts, new construction, arranged by Prof. Walter Gropius of Berlin.
July-Oct.	International Hygienic Exhibition at Dresden, Germany. Buildings include a model hospital and a model housing project.
Aug. 4-9	International Exposition of American Import Trade, Grand Central Palace, New York.
Aug. 12-21	Study Tour of the International Housing Association in Denmark, Sweden and Norway.
Sept. 7-14	Twelfth International Congress of Architects, Budapest, Hungary.
Sept. 8-13	A course of lectures on *Fundamentals of Architecture* for members of Illuminating Engineering Society, conducted by the School of Architecture, Columbia University, N. Y.
Oct. 1	The Committee of Twenty on Street and Outdoor Cleanliness, 2 East 103rd Street, New York City, have extended their prize contest for the design of a Litter Basket for New York City till October 1. First Price $500.
October	The Department of Architecture of the University of New York will begin a series of lectures on "Promoting and Financing Building Projects."
Oct. 7-10	Annual convention of the Illuminating Engineering Society. Hotel John Marshall, Richmond, Va.
Oct. 8-12	Sixth National Conference of Church Architecture, Cleveland, Ohio.
Nov. 18-29	Art Exhibition, Royal Institute of British Architects, London (9, Conduit Street).
1930	Entries in the competition for the most beautiful bridge in North America are invited. Information can be had from F. H. Frankland, c/o Bridge Committee, American Institute of Steel Construction, Inc., 200 Madison Ave., New York City.

LOUIS ALLEN ABRAMSON, Architects. Offices are now located at 25 West 45th Street, New York City.

WILLIAM J. STONE announces the dissolution of the partnership of Brockway and Stone and the opening of new offices at 247 Security Building, Pasadena, California.

A. J. DAIDONE AND S. L. GRANT announce that they have formed a partnership for the practice of architecture under the firm name of Daidone & Grant, 189 Montague Street, Brooklyn, N. Y.

THE ARCHITECTURAL FIRM of F. Trevor Hogg and Walter E. Campbell, newly formed, wishes to receive manufacturers' samples and literature.

BAYARD L. BARNWELL, Architect, has opened an office at 1419 Esperson Building, Houston, Texas, and desires manufacturers' samples and catalogues.

MESSRS. WEATHERHEAD AND WALL, Architects and Structural Engineers of Saint John, N. B. Canada, wish to announce that they have opened a branch office in the Higgins Building, Main Street, Moncton, N. B. Mr. E. Clain, Manager. Manufacturers' catalogues and samples are requested to complete files.

INTERNATIONAL CONGRESS OF ARCHITECTS

The twelfth International Congress of Architects will take place at Budapest between September 7-14. The conference will consider questions of international concern in architecture and an exhibition of work of all important countries will be shown.

LITTER BASKET COMPETITION

As a means of affording the public an opportunity to cooperate with the city in keeping the streets clean, the Committee of Twenty on Street and Outdoor Cleanliness, appointed by the New York Academy of Medicine, offers two prizes, one of $500 and a second of $250 for the best and second best design for a litter basket.

All applications and inquiries for further information should be addressed to the Committee of Twenty on Street and Outdoor Cleanliness, 2 East 103rd Street, New York City.

COMPETITION FOR A REMODELED HOUSE

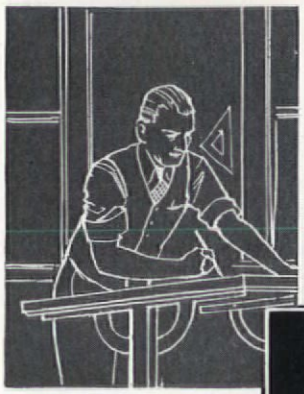
A contest to find the best example of a house successfully remodeled is announced by Railroad Cooperative Building and Loan Association of 441 Lexington Avenue, New York City. Anyone who has recently remodeled a home is invited to compete in showing unique and ingenious ways in which houses are modernized. The following awards are to be made: $100 to the person submitting the best story and photographs of such modernization; $50 to the second best; $25 to the third best; and $5 to each of the next five.

Before and after photographs are desired to accompany the manuscript telling of the modernization process.

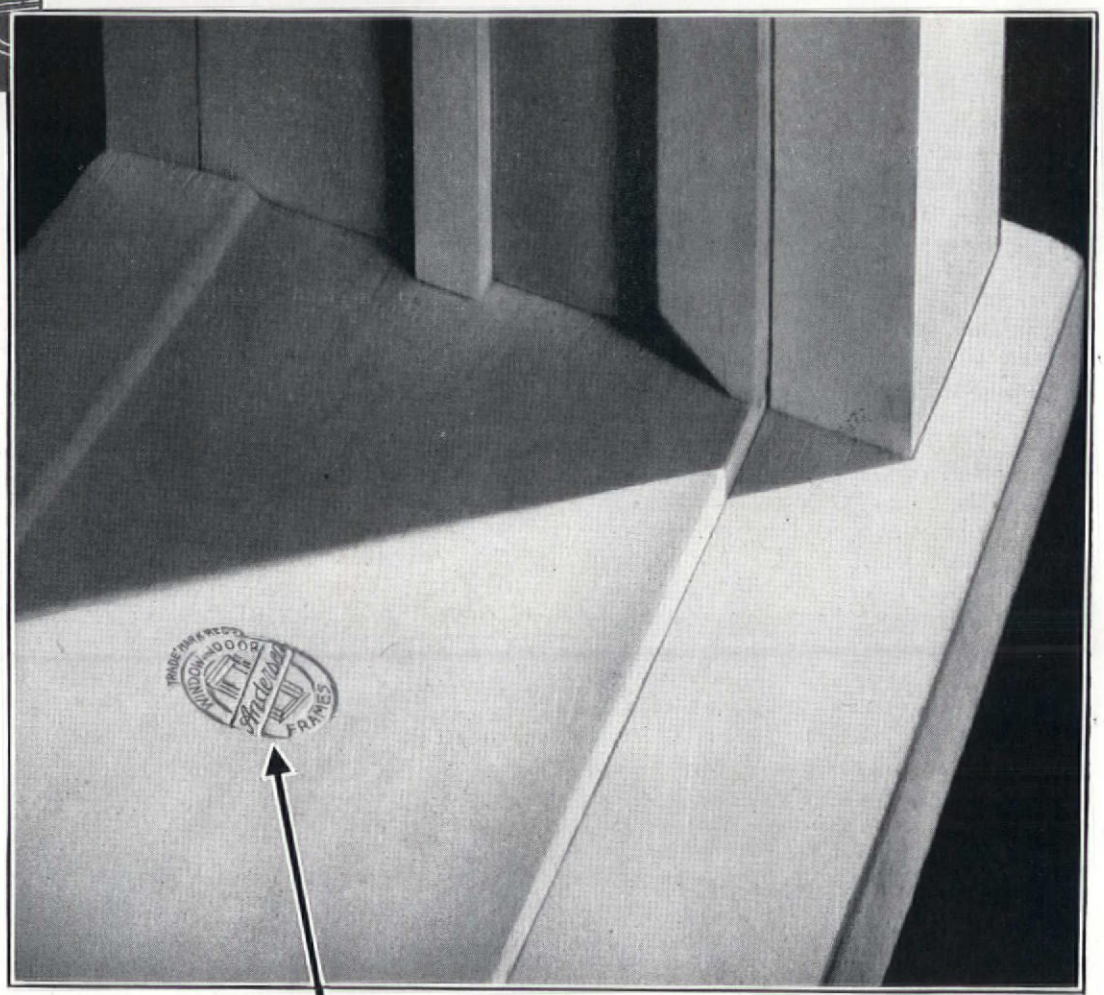
Contestants are requested to have all submissions in the office of the Editor of "Building-Loan," 441 Lexington Avenue, New York City by August 1, 1930. A committee of architects will serve as judges.

BRIDGE AWARDS

The American Institute of Steel Construction annual award for "the most beautiful long-span steel bridge built last year" was given to the McClintic-Marshall Company for the Mount Hope Bridge near Portsmouth, Rhode Island. A second award for the "most artistic" short-span bridge was awarded to the Mount Pleasant Bridge, constructed by the Bethlehem Steel Company



Architects welcome this new frame with locked sill-joint, which adds to the value of a home . . . .



The new Andersen Master Frame (solid sill) showing diecut circle trade-mark, guarantee of quality. This frame also made in sub-sill type.

ARCHITECTS who once specified custom made window and door frames, now write "Andersen Master" on their specification sheets.

They appreciate fine quality — the genuine white pine, the new locked sill-joint, the steep sill slope, the wide blind stop feature---home comfort insurance.

Andersen Master Frames truly give a building added value — at an actual cost saving when labor time is considered. You, too, should specify "Andersen." Send for your copy of our catalog, No. 500.

Andersen Frame Corporation, Bayport, Minnesota, represented by 3,500 leading jobbers and dealers.

Andersen MASTER *Frames*

OF GENUINE WHITE PINE — FOR WINDOWS AND DOORS

BAYPORT — MINNESOTA

FOR WEATHERTIGHT INSTALLATIONS — USE ANDERSEN SPECIFICATIONS

over the Harlem Division of the New York Central Railroad at Mount Pleasant, New York, for the Westchester County Park commission.

Admirable as is the intention of The American Institute of Steel Construction in making these aesthetic awards there is a wide open question as to whether a bridge should be built to be "most practical" or "most beautiful," or is not the bridge aesthetically satisfactory if it is good engineering?

IMPROVED HOUSE PLANNING

It is perhaps natural that, while the cost of building a house has increased, the average size of rooms has contracted. At the same time we have crowded many expensive utilities into our cramped quarters with the desire to expand our rooms without adding to the total cost of the house. H. L. Davis in the April *American Mercury* points out that the only way to expand contracted space, "except by practicing magic, is to make every available room perform more than one function. Instead of two small rooms, each of which remains idle 50% of the day, let us have one large room that works both day and night; and in order to take advantage of this combination, let every fixture in the room be as flexible as possible. There are limitations to this programme, for certain rooms must remain specialized; but we can go a long way without reaching them.

"To make a room perform more than one set of functions, one must consider both construction and decoration together. In England it is the practice to build houses for workmen and middle-class people without any built-in fittings; hence the bedroom discloses itself as such, no matter what the character of the bed, by reason of the fact that it will contain a wardrobe: similarly, the dining-room will contain a china closet. Once the character of a room is so established, there is no possibility of turning it to more than one function without obviously resorting to makeshift. The real solution of the problem has gradually been approached by the American architect; and by a curious chance, he has reached it in quarters where neither crowding nor economy were necessary. Instead of permitting a dresser, let us say, to bulk out in a dressing-room, he arranges a set of drawers in a closet: not merely does he get it out of the way, but he makes it more dustproof than before. This principle is capable of being pushed much further. With the aid of sliding doors, a whole wall may be turned into a closet, neatly embracing a chest of drawers, a dressing-table, and a clothes-rack; or, on a well-hung door, a dressing-table and stool may be brought out temporarily into the room and restored to the wall when needed.

"By sacrificing thirty inches in the depth of a room, all the necessary utilities can be contained in a dust-proof closet, much easier to clean and keep in order than if they projected into the room. Our ingenuity has scarcely begun to work here. While our Puritan ancestors devised chairs that served as writing-desks and tables that became settles, almost the only contribution modern America has made is the bed that folds into a closet. In a highly cramped bedroom, this solution may occasionally be useful; but of all possible objects to stow away, a bed is the poorest candidate. For a well-constructed daybed is capable of performing twenty-four hour service; and to hide it in a closet two-thirds of the day is the height of uneconomic furnishing.

"By the expedient just described we have done something more than robbed the room of its specialized character and made it available as a general workroom or gathering place during the day—permitting the bedroom to be also a living-room or the living-room to be a dining-room: we have increased the amount of apparent space. The effect of spaciousness in a room is created by decreasing the number of objects in it and reducing their size. In this department, too, hygiene and utility have the backing of aesthetics. One of the anomalies of present-day manufacture is that our furniture makers continue to be sublimely unaware that the actual living space of a modern urban family is highly embarrassed by their ostentatious products. The scale and general design of furniture must take into account this fact: a certain lightness and delicacy must be achieved, without of course sacrificing comfort or durability. At a recent exhibition, Kem Weber showed some dining-room chairs which had this quality; and one wishes it were achieved more often."

"CHOOSING AN ARCHITECT"

Architects for school projects cannot safely be chosen on the basis of rendered sketches submitted by competing architects nor is it ethical that an architect "sell" himself to the board. A competition conducted under the guidance of The American Institute of Architects is an approach to a satisfactory management since the selection of jury, and rights of architects competing are amply protected. Competitions, however, are diminishing in form. There is a growing realization that a well qualified architect can only be obtained by investigation and a thorough consideration of the designers qualifications and experience. Some school boards have made themselves the seeking buyer, "refusing to let anyone sell it, and refusing to be sold." Services rather than the architect are demanded.

The New Jersey Chapter of the American Institute of Architects, through its special joint committee under direction of Mr. Harry T. Stephens has prepared a helpful document on "The Choosing of An Architect," in which methods of choosing an architect are described. The document will be of use to architects in educating school boards. Copies may be obtained by addressing Mr. Harry T. Stephens, 152 Market Street, Paterson, New Jersey.

No other belt has the *long life* or can offer all the advantages of the DAYTON COG-BELT

Certain definite, exclusive features of Dayton Cog-Belts are responsible for the outstanding success of Dayton Cog-Belt Drives. These features cannot be duplicated by any other V-Belt.

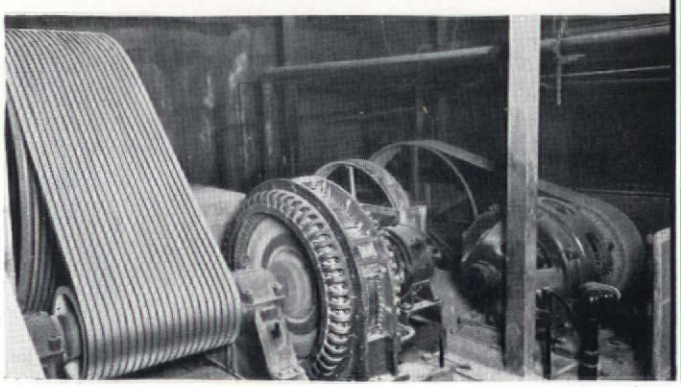
For example, no other V-Belt is laminated and die-cut in its finished state, for these are exclusive Dayton features. All others must be moulded.

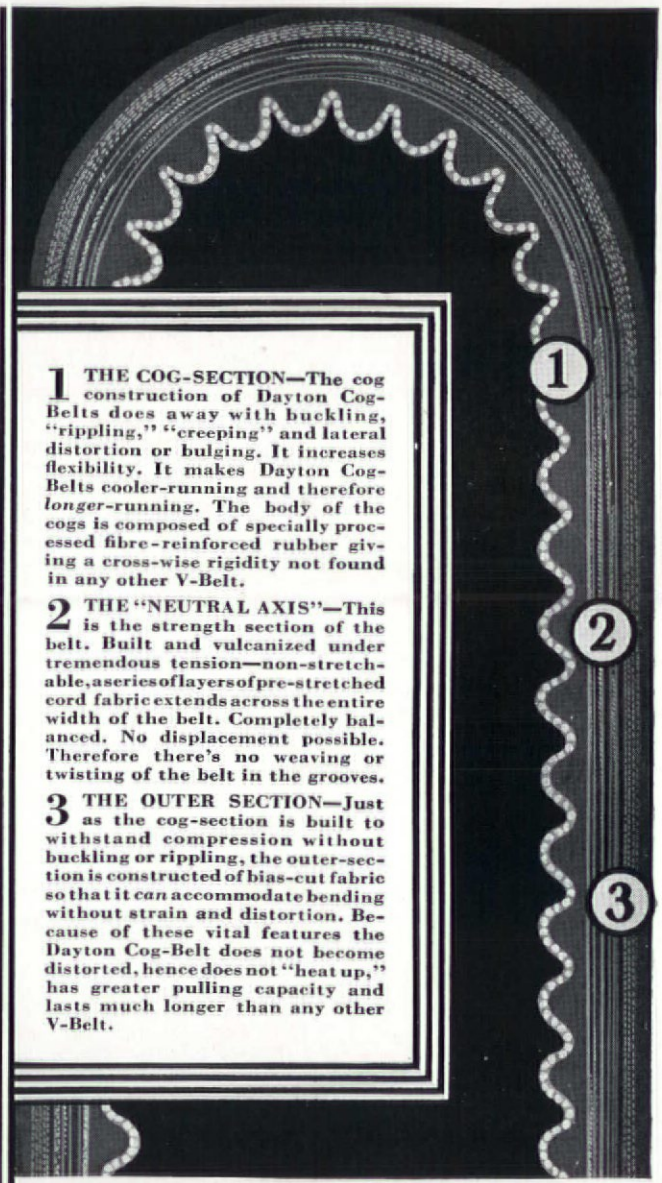
Dayton construction eliminates distortion. Daytons are—and remain—accurate—give truer alignment—have a firmer grip in the pulley grooves due to the die-cut raw edge contact-driving surface—there is no slippage.

And Dayton Cog-Belts do not stretch—in the manufacture of no other V-Belt is the fabric kept under such tremendous tension during the vulcanizing process—the pre-stretching of the fabric is thus made permanent in the finished belt, which means fewer adjustments—less maintenance and longer life.

But let us give you complete information about these and the many other outstanding features that give Dayton Cog-Belts their amazing efficiency and long life. Send for a Dayton Cog-Belt Drive catalog and a sample section of the belt.

THE DAYTON RUBBER MANUFACTURING CO.
Dept. AR-7-30, Dayton, Ohio
Factory Distributors in Principal Cities and all Westinghouse Electric and Manufacturing Company Sales Offices





1 THE COG-SECTION—The cog construction of Dayton Cog-Belts does away with buckling, "rippling," "creeping" and lateral distortion or bulging. It increases flexibility. It makes Dayton Cog-Belts cooler-running and therefore *longer*-running. The body of the cogs is composed of specially processed fibre-reinforced rubber giving a cross-wise rigidity not found in any other V-Belt.

2 THE "NEUTRAL AXIS"—This is the strength section of the belt. Built and vulcanized under tremendous tension—non-stretchable, a series of layers of pre-stretched cord fabric extends across the entire width of the belt. Completely balanced. No displacement possible. Therefore there's no weaving or twisting of the belt in the grooves.

3 THE OUTER SECTION—Just as the cog-section is built to withstand compression without buckling or rippling, the outer-section is constructed of bias-cut fabric so that it *can* accommodate bending without strain and distortion. Because of these vital features the Dayton Cog-Belt does not become distorted, hence does not "heat up," has greater pulling capacity and lasts much longer than any other V-Belt.

Dayton
COG-BELT DRIVES

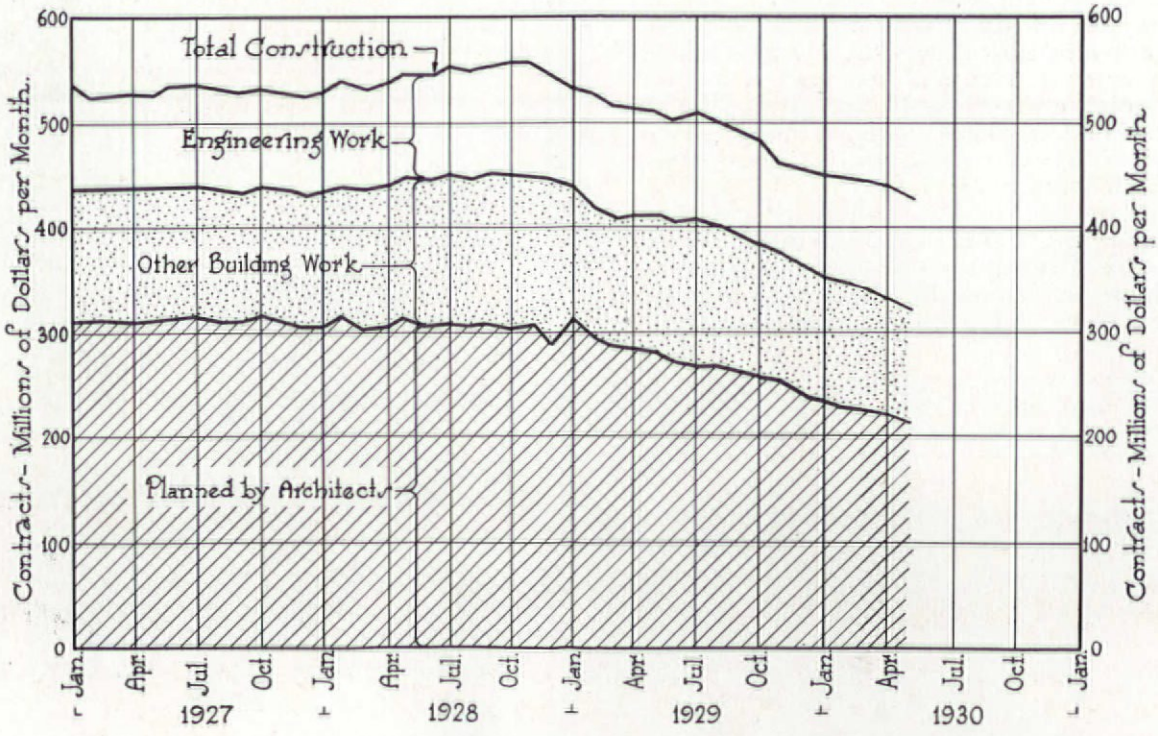
COMPLETE DRIVES—PULLEYS AND BELTS—
IN STOCK—ALL RATIOS 2 H. P. TO 100 H. P.

CONSTRUCTION STATISTICS

From the records of F. W. DODGE CORPORATION, Statistical Division. The figures cover the 37 states east of the Rocky Mountains and represent about 91 per cent. of the country's construction volume. They include projects amounting to $5,000 and up.

First Five Months, 1930

	TOTAL CONTRACTS		WORK PLANNED BY ARCHITECTS		
	Number of Projects	Valuation	Number of Projects	Valuation	Per Cent. of Total
Commercial Buildings	10,327	$350,538,300	3,943	$278,895,000	51
Industrial Buildings	2,355	238,785,100	809	81,003,900	34
Educational Buildings	1,642	147,644,600	1,387	142,107,200	96
Hospitals & Institutions	464	75,548,900	363	69,050,700	91
Public Buildings	534	53,768,300	330	43,892,400	82
Religious & Memorial Buildings	818	44,416,400	566	41,425,500	93
Social & Recreational Projects	1,075	56,318,300	663	49,578,000	88
Apartments & Hotels	2,376	168,080,400	1,314	142,138,000	85
One & Two Family Houses	30,422	314,516,700	7,377	142,992,000	45
Total Building	50,013	1,449,617,000	16,752	991,082,700	68
Public Works & Utilities	7,572	587,822,900	117	20,228,900	3
Total Construction	57,585	$2,037,439,900	16,869	$1,011,311,600	50
Total Construction, 1st 5 months, 1929	75,253	$2,485,655,700	21,972	$1,275,463,300	51



General Trend of Building and Engineering Construction

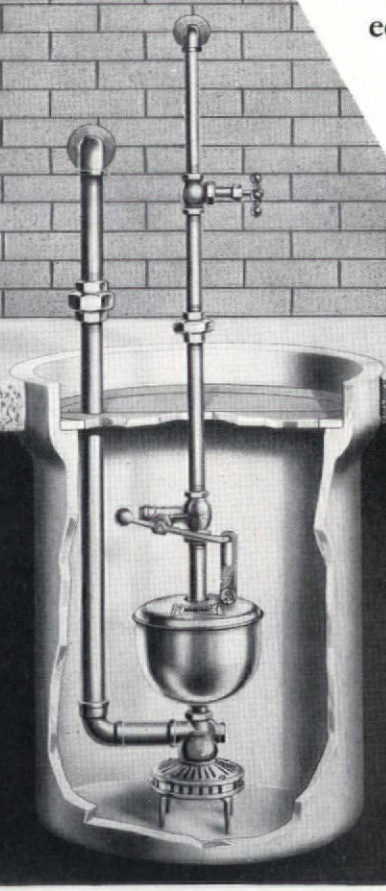
the Pumps that *Cannot Rust*

Rust, the eternal enemy of iron and steel, is ever alert for the attack whenever these metals are exposed to water, and protective coatings are at best only a partial defense. ¶ Positive protection against the danger of rust has been achieved in the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Cellar Drainer, by the complete elimination of iron and steel. These pumps are built of copper and bronze throughout — they cannot rust. ¶ Dependability and economy of operation are consistent with the quality of materials used in the Penberthy Automatic Cellar Drainer and the Penberthy Automatic Electric Sump Pump.

Both types are carried in stock by leading jobbers throughout the country

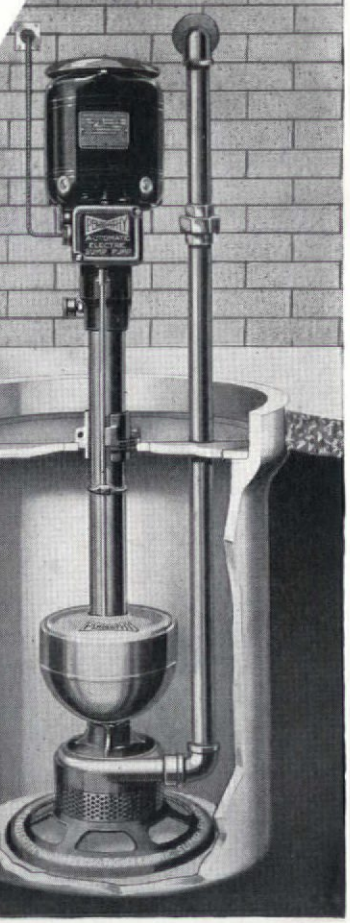
PENBERTHY PRODUCTS

Automatic (Hydraulic) Cellar Drainer



PENBERTHY PRODUCTS

Automatic Electric Sump Pump



COPPER AND BRONZE THROUGHOUT

PENBERTHY INJECTOR COMPANY

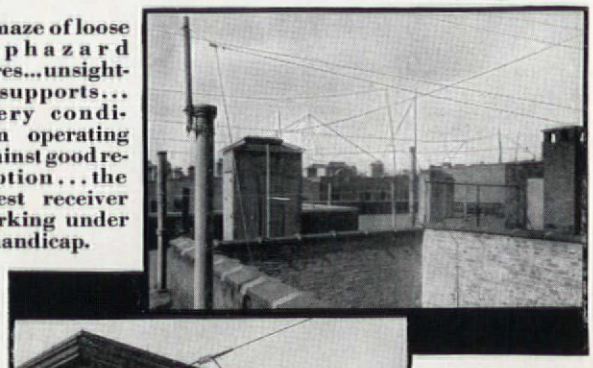
ESTABLISHED IN 1886

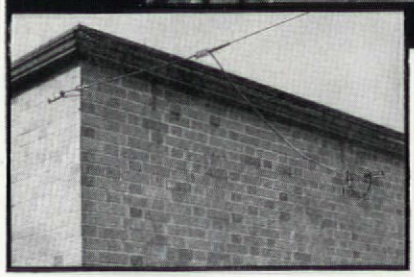
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No more unsightly aerials . . . far better radio reception

A maze of loose haphazard wires...unsightly supports... every condition operating against good reception... the finest receiver working under a handicap.





A neat, inconspicuous antenna serving all apartments ... purposely designed and installed... efficient, modern and incomparable in results.

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Provides antenna and ground outlets in all suites

Regardless of the size of the building, or the number of apartments (or individual radio outlets) they can all be connected with the RCA Centralized Radio System.

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RCA Centralized Radio equipment is also designed for hotels, hospitals, sanitariums, schools, passenger ships, etc., where transient occupants of rooms may enjoy radio programs or phonograph record entertainment from loudspeakers or headsets, all operated from a central control.

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A REVIEW OF CATALOGUES

HEATING GAS

Hand book on gas boilers. Floor plans, design and color scheme, also position of gas boiler in combination laundry and heater room, basement recreation and moving picture projecting room, basement play room, basement man's room. Section drawing of boiler and description of parts. Various models and their application. Tables: Ratings, dimensions, etc. Dimensional drawings. Gas boiler controls. 8½ x 11 in. 20 pp. Ill. Also, hand book on gas water boilers. Ratings and capacities. Tables to calculate boiler and storage tank capacities, to determine hot water consumption for various types of buildings. Chart on the cost of water heating. Automatic hot water storage systems. Principal dimensions and dimensional drawings. Construction details and specifications. 8½ x 11 in. 20 pp. Ill. Also, hand book on gas furnaces. Guaranteed ratings. Tables to determine size of warm air pipes for residence use. Dimensions and tables. Specifications. 8½ x 11 in. 12 pp. Ill. The Bryant Heater & Mfg. Co., 17825 St. Clair Ave., Cleveland, Ohio.

LIGHTING, CHURCH

Bulletin No. 1. Description, including particulars of manufacture, finish, glass, size and price of three types of lanterns. Beardslee Chandelier Manufacturing Co., 216–220 South Jefferson St., Chicago, Ill. 8½ x 11 in. 4 pp. Ill.

FLOORS, LINOLEUM

"New Ideas in Home Decoration," by Hazel Dell Brown. How to plan correct decoration for any room in the house. Special treatment and appropriate design of linoleum floor for studio, living room, dining room, sun room, play room, girl's room, boy's room, kitchen, etc. Color schemes and their application. Special floor effects of linotile and cork tile. Styles and finishes of linoleums and varied uses in the home. Linoleum rugs. Armstrong Cork Company, Floor Division, Lancaster, Pa. 8⅛ x 11 in. 40 pp. Ill.

WROUGHT IRON

Separate pieces of special design, including radiator covers, gates, fireplace fittings, etc., railings, grilles. Measurements and prices. Midwest Metal Art Division of the Newman Manufacturing Co., Cleneay Ave. and N. & W. R.R., Norwood Station, Cincinnati, Ohio. 9 x 12 in. 8 pp. French fold. Ill.

HEATING, GAS

Duplex unit control gas heating system. General description. Information on control, ventilation, enclosures, radiators. Detailed drawings. Indirect radiator system. Exhaust piping fittings and fan. Instructions for wiring. Directions for starting and adjusting a new installation and for operating units. Charts and tables. Roberts-Gordon Appliance Corp., Curtiss Bldg., Delaware Ave. at Tupper Street, Buffalo, N. Y. 9½ x 11¾ in. 20 pp. Ill.



FOR NEAT BRICKWORK

THE mason can do neater, cleaner brickwork with Brixment than with any other mortar.

Because Brixment makes an unusually rich and plastic mortar which sticks to the brick and doesn't slop over the face of the wall.

Brixment is manufactured to harden a little more slowly than portland cement. This enables the mason to strike the joints conveniently, neatly and uniformly before the mortar sets up. Louisville Cement Company, Incorporated, Louisville, Kentucky.

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BRIXMENT

for MASONRY and STUCCO





The **BALTIMORE TRUST Building**

—one of the finest buildings in Baltimore, Md. The Architects were Taylor & Fisher and Smith & May, all of Baltimore. The Engineer was Herman F. Doeleman and the General Contractor J. Henry Miller, Inc.

The services rendered by Robert W. Hunt Company on this building included mill and shop inspection and supervision of the erection of 7567 tons of structural steel supplied and installed by McClintic-Marshall Co.

See Sweet's A4

STEEL AT SHOP AND FIELD
CEMENT—CONCRETE
CONCRETE SUPERINTENDENCE

ROBERT W. HUNT COMPANY
Engineers
Inspection . . . . Tests
Insurance Exchange
CHICAGO
All Large Cities

FLOW METERS

"Instructions for Installation and Care of Brown Electric Flow Meters." Mechanism of the various types of Brown Flow Manometers, Indicators and Recording Instruments. Instructions for installation, adjusting instruments for zero readings and changing range tubes. Practical suggestions for avoiding difficulties. Tables of correction factors for pressure, quality and superheat of steam. Detailed and section drawings. General notes on care and operation. Drilling dimensions. Tables. The Brown Instrument Company, Philadelphia, Pa. 7⅞ x 10½ in. 40 pp. Ill.

HOSPITAL KITCHENS

"Practical Planning for Hospital Food Service." (Last of a series of five books on food service planning.) All phases of the planning of proper facilities for the preparation and serving of food in hospitals and institutions. Different types of service, practical kitchen layouts, diet kitchens, nurses' cafeterias, etc. Floor plans. Solutions of certain architectural and engineering problems involved in Hospital Food Service Planning. The John Van Range Co., 1200 West 35th St., Chicago, Ill. 8½ x 11 in. 62 pp. Ill.

TILE FLOORING

Full description of Bird tile flooring. Sizes; appearance; colors; varied tests—indentation, immersion, abrasion, flexure, flame. Actual samples. Bird & Son Sales Corporation, East Walpole, Mass. 8½ x 11 in. 8 pp. folder. Ill.

ASH CONVEYOR SYSTEM

Development of the Steamatic Pneumatic Ash Conveyor System. Operating advantages, including low steam consumption, low maintenance, dustless and noiseless features, remote control. Range of application. Sizes and capacities. Results of tests. Detailed drawings. United Conveyor Corporation, Old Colony Building, Chicago, Ill. 8½ x 11 in. 16 pp. Ill.

PANELBOARDS AND SWITCHBOARDS

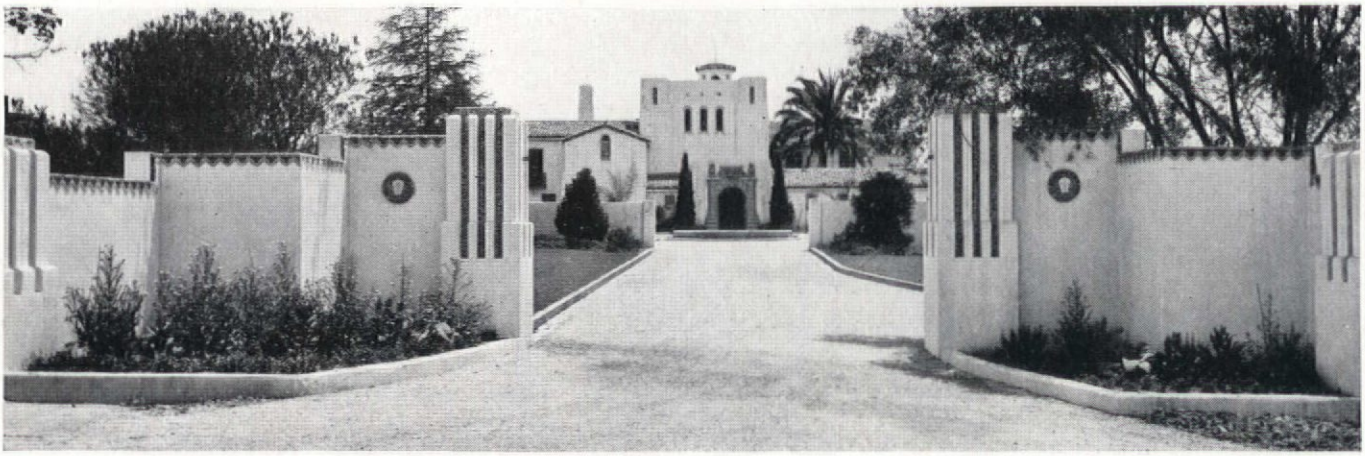
Bulletin No. 49. The "Switchfuz" unit. Features of design including unit construction, external operation, combination switch and fuse. Operation and economical installation. Applications. Suggested specification for safety type "Switchfuz" switchboard. Frank Adam Electric Co., St. Louis, Mo. 7¾ x 10⅝ in. 8 pp. Ill.

HEATING SPECIALTIES

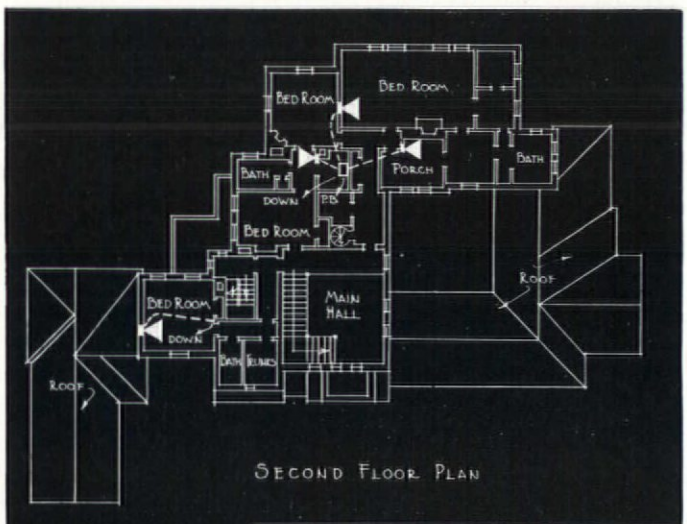
Data book containing detailed design and specification information relating to the Thermoflex line of traps, valves and related accessories. Description of manufacture with the Hydron process. Certificate of inspection tag attached to each unit. List prices, capacities and dimensions. 8½ x 11 in. 19 pp. (Loose leaf.) Ill.

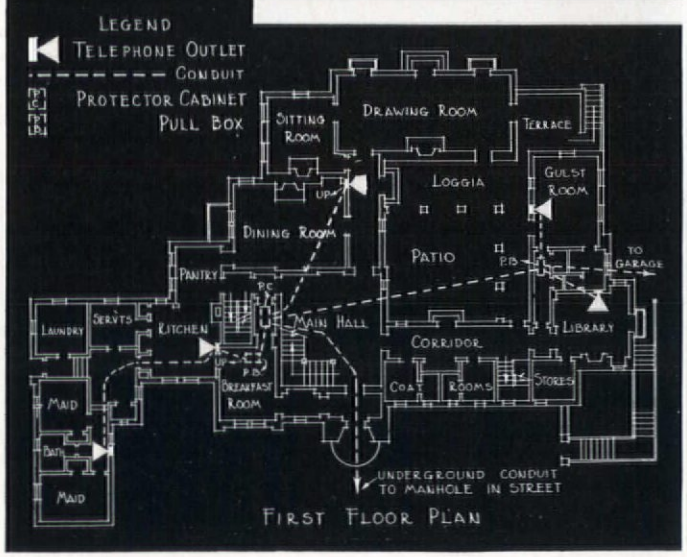
(Continued on page 188)

Telephone Convenience adds to the Individuality of a Residence



Complete telephone convenience is provided for in the residence of Mr. Francis Whitaker, 1155 Angelo Drive, Los Angeles, Cal., by ten telephone outlets, including one in the garage. Conduit within the walls and floors carries the wiring for the telephone system which will include inter-communicating features.
CARLETON M. WINSLOW, Architect, *Los Angeles.*





CERTAIN things contribute to the effectiveness of the well-designed home: its beauty . . . excellence of materials . . . other carefully chosen features which assure the comfort of those who live in it. The achievement of complete convenience, so essential to modern life, is increasingly claiming the attention of architects in every part of the country. And a considerable part of this attention is being directed to *telephone convenience.*

Many people who move into new homes, or who have their residences remodeled, desire to have telephones in all the important rooms. They realize how many steps and how much time this will save. And architects are meeting this modern need by planning for the telephone arrangements in advance of construction, and specifying conduit to all locations where telephone outlets may be desired. The home owner can then use just those outlets which best meet his requirements, and he can enjoy the improved appearance which comes from concealed wiring.

Representatives of the local Bell Company will gladly confer with you and your clients relative to appropriate locations for telephones. There is no charge. Just call the Business Office.

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES
BELL SYSTEM

KANE QUALITY Venetian Blinds

for the Control of

Light • *and Perfect Ventilation*

SINCE "KaneQuality" 1890

By the Makers of "KANE QUALITY" Screens



"KANE QUALITY" Venetian Blinds offer the modern, ideal medium for the perfect control of Light and Ventilation in Offices, Hotels, Public Buildings and Residences.

To provide perfect diffusion of daylight, direct light rays to distant or nearby parts of the room, give flexible control of air currents with avoidance of direct drafts, assure privacy and add the distinction of good taste—these are functions of "KANE QUALITY" Venetian Blinds.

Made from Genuine Port Orford Cedar, the slats never check, split or warp and take a beautiful finish in any desired color.

Important improvements assure ease of operation and long service. Made in several types to meet every need. Write us regarding your requirements. See our catalog in SWEET'S.

KANE MANUFACTURING COMPANY . . . . . • KANE • PENNA.

A REVIEW OF CATALOGUES—Continued

LAUNDRIES

Reference data and information on laundries for hotels, hospitals, schools, clubs, office buildings, department stores, large residences. Floor drainage, lighting and ventilation. Small and big-capacity machines; other equipment. Floor plans. The American Laundry Machinery Company, Norwood Station, Cincinnati, Ohio. 9⅜ x 11¾ in. 20 pp. Blueprints. Ill.

INDIANA LIMESTONE

Indiana limestone for bridges and for public utility buildings. Why Indiana limestone is and should be used and where it has been used. Typical installations. Indiana Limestone Company, Bedford, Indiana. Two 4-page folders. 8½ x 11 in. Ill.

KITCHEN EQUIPMENT

Nappanee Kitchen Equipment Units as made by Coppes Bros. & Zook, Inc., are shown in color, outline and photograph in 8 pages. Full descriptions tell of the features of single and combination cabinets for general utility purposes in kitchen and pantry. Wood is chiefly used in construction, but steel and porcelain are shown for refrigerator, range, sink and miscellaneous accessory purposes, all of which are integral with the cabinet combinations. Containers for supplies, utensils and devices for systemizing work are shown and described. 8 pp. Coppes Bros. & Zook, Inc., Nappanee, Ind. (This catalogue is in Sweet's for 1930.)

CALDWELL SASH BALANCES

Backed by Forty Years' Experience



SIDE

Each Caldwell Sash Balance has a quality built into it that assures satisfaction, and maximum length of service.

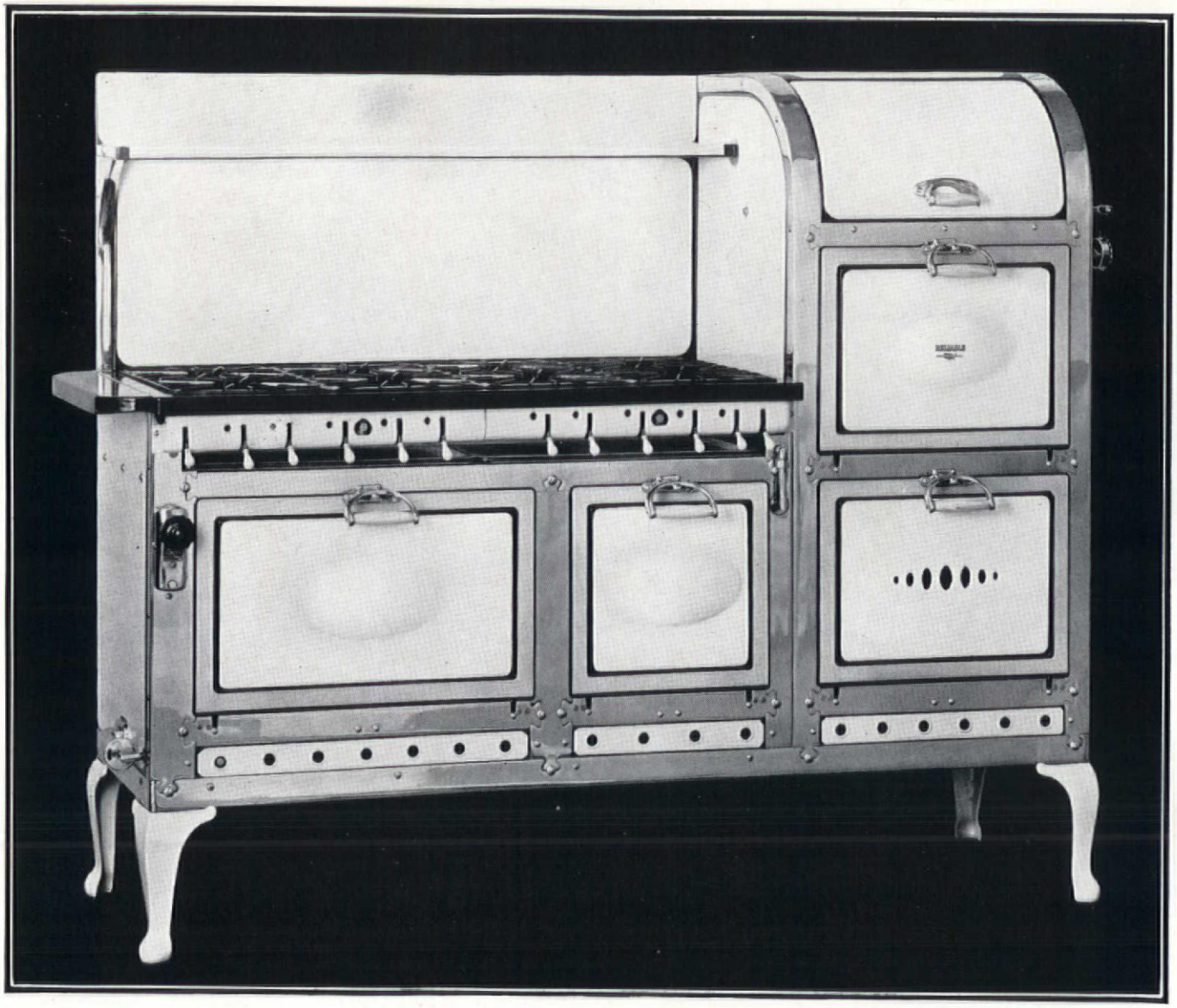
Box Frames can be eliminated, thus contributing greatly to making a building of warm construction. They also permit the use of narrow mullions and double hung windows in rows to give the casement effect. Mortises can be cut at the mill to one size. When the saving of labor and material is considered, they cost no more than ordinary weights and cords.



TOP

Send for booklet "Present Day Architect"
Giving Mortise Dimensions

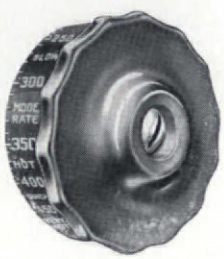
CALDWELL MANUFACTURING COMPANY
ROCHESTER, NEW YORK, U. S. A.



Something New . . . Reliable Gas Ranges now built to individual specifications for finest residential and apartment homes. ◙ ◙ These famous stoves have rigid framework of unbreakable Angliron, finished in durable, sparkling chromium that will not stain or tarnish. Hand-fitted construction by master craftsmen. Neither time nor service can injure the brilliant beauty of these magnificent gas ranges. ◙ ◙ Special designs of Reliable Custom-Built Gas Ranges will be created to meet any space- or service-requirements. Blueprints submitted for approval. Many installations now giving exceptional satisfaction. Correspondence invited from those who seek individuality, permanent beauty and a complete and faultless cooking service.

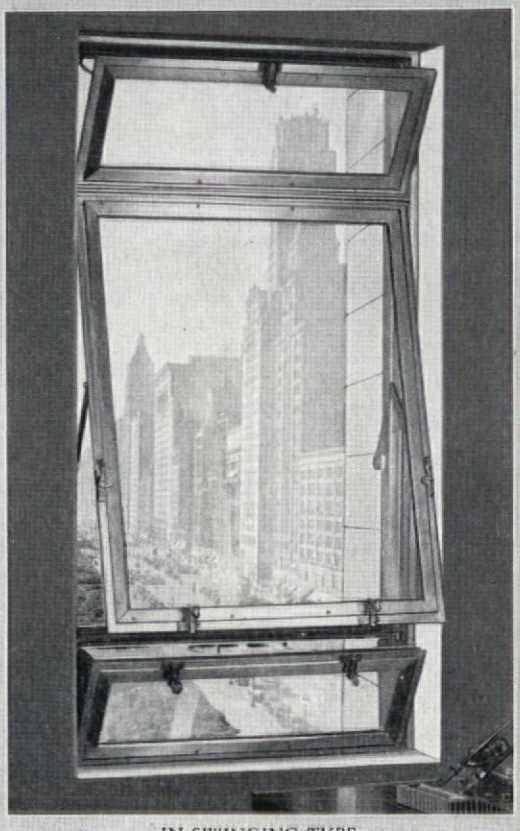
Write for catalog "Custom-Built Gas Ranges"

AMERICAN STOVE COMPANY · DEPT. B, 555 CHOUTEAU AVENUE, ST. LOUIS, MO.
Largest Makers of Gas Ranges in the World

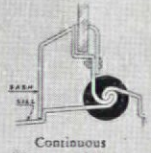


It Is a GOOD Gas Range That Has This Red Wheel

WINDOWS



IN-SWINGING TYPE
SEALAIR WINDOW



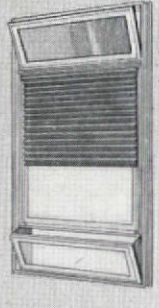
Continuous Water-proof hinge. Patents applied for.

VENTILATION

In-swinging Sashes permit controlled ventilation, without unpleasant drafts.

CLEANING

May be washed entirely from the inside.



Application of shade. Translucent glass in transom.

INSULATION

When closed, insulation between sash and frame protects against weather.

SAFETY

Difficult for anyone to fall or leap out.

NOISELESS

Sealair Windows will not rattle — operate easily, silently and independently.

Furnished in Bronze, Aluminum, Alloy or Steel. All joints strongly welded.

Kawneer
SEALAIR
WINDOWS

THE KAWNEER COMPANY, NILES, MICHIGAN
KAWNEER MFG. CO., BERKELEY, CALIF. (SUBSIDIARY)
Manufacturers of
RUSTLESS METAL STORE FRONTS, WINDOWS AND DOORS

CLASSIFIED DIRECTORY OF ADVERTISERS

Alphabetical Index to Advertisers, Page 206

After reviewing advertisements in this issue—use Sweet's Architectural Catalogues for 1930 for catalogue and specification information on the products of the most of the manufacturers.

Acid Proof Chemical Stoneware
Knight, Maurice A.

Acoustical Installation—Armstrong Cork & Insulation Co.
Guastavino, R., Co.

Acoustics
Armstrong Cork & Insulation Co.
Boston Acoustical Eng. Division of Housing Company
Johns-Manville Corp.

Air Compressors
Westinghouse Traction Brake Co.

Air Conditioner
Airway Electric Appliance Corp.
American Blower Co.
Buffalo Forge Co.
Lewis Corporation

Air Washer
Buffalo Forge Co.

Aluminum
Aluminum Co. of America

Anchors—Concrete
Bulldog Floor Clip Co.

Arc Welding—Lincoln Electric Co.

Architectural Supplies
Higgins, Chas. M., & Co.

Artstone—Rackle, George, & Sons Co.

Asbestos—Johns-Manville Corporation

Balances, Sash—See Sash Balances

Basement, Windows—Steel
Detroit Steel Products Co.
Truscon Steel Company

Bathroom Accessories
Parker Charles Company

Beads—Corner Metal
Milcor Steel Co.
Truscon Steel Company
Wheeling Corrugating Co.

Beams, Angles, Channels, Etc.
Bethlehem Steel Co.
Carnegie Steel Company
Jones & Laughlin Steel Corp.

Belts—Dayton Rubber Mfg. Co.

Blackboards—Weber Costello Co.

Boiler and Pipe Covering
Johns-Manville Corporation
Ric-wiL Company

Boilers—American Gas Products Co.
American Radiator Co.
Bryan Steam Corp.
Dahlquist Mfg. Co.
Heggie-Simplex Boiler Co.
Pierce, Butler & Pierce Mfg. Co.
Smith, H. B., Company, The, Inc.
Titusville Iron Work Co.
Wood Gar Engineering Co.

Bolts—Door—Corbin, P. & F.

Brass and Bronze
See "Ornamental Metal"

Brass and Copper
See "Copper and Brass"

Brick—Finzer Bros. Clay Co.

Bridges—Steel—American Bridge Co.
Bethlehem Steel Co.

Builders—Stone & Webster, Inc.

Buildings—Steel
Carnegie Steel Company
Nat'l Assoc. of Flat Rolled Steel Mfrs.

Butts—Corbin, P. & F.
Stanley Works

Cabinet Work—Hyde-Murphy Co.

Cabinets—Kitchen
Olean Metal Cabinet Works, Inc.

Cabinets—Medicine—Parker Charles Company

Cabinets—Toilet Paper
Victoria Paper Mills Co.

Casement Operators—Rixson, Oscar C., Company

Casements—Crittall Casement Window Co.
Detroit Steel Products Co.
International Casement Co.
Mesker Bros. Iron Company
Truscon Steel Company

Cast Stone
Cast Stone Institute

Cellar Drainer
Penberthy Injector Co.

Cement—Louisville Cement Company
Medusa Portland Cement Co.
Portland Cement Association
Universal Atlas Cement Co.

Cement White
Medusa Portland Cement Co.

Chain Sash—American Chain Co., Inc.
Detroit Steel Products Co.
Smith & Egge Mfg. Co.

Chairs—Marble, B. L., Chair Co.

Channels—Carnegie Steel Co.
Concrete Engineering Co.
Jones & Laughlin Steel Corp.

Church Memorials
American Seating Company

Clamps—Lock Joint
Hyde-Murphy Co.

Clay Vitrified
Clay Products Association

Cleaning Systems
Spencer Turbine Co.

Clocks, Electric
Landis Eng. & Mfg. Co.

Columns, Porches, Etc.
Hartmann-Sanders Co.
Union Metal Mfg. Co.

Compressors—Air
Westinghouse Traction Brake Co.

Concrete Accelerator
Master Builders Co.
Solvay Sales Corp.

Concrete Construction—Reinforced
American Steel & Wire Company
Concrete Engineering Co.
Truscon Steel Company

Concrete Hardener
Master Builders Co.
Sonneborn, L., Sons, Incorporated
Solvay Sales Corp.

Concrete Piling—See Piling—Concrete

Concrete Ready Mixed
Transit Mixers, Inc.

Concrete Surface Treatment
Master Builders Co.
Solvay Sales Corp.

Conduit for Underground Heating Pipes
Ric-wiL Company

Conduits
Fibre Conduit Co.
Fretz-Moon Tube Co.
Garland Mfg. Co.

Conduo-Base
Conduo-Base Co.

Coping Wall
Clay Products Association

Copper and Brass
Revere Copper & Brass, Inc.

Copper Sheets
Revere Copper & Brass, Inc.

Cork Covering
Armstrong Cork & Insulation Co.

Cork Tile Flooring
Armstrong Cork Company, Custom Floors Dept.

Corkboard
Armstrong Cork & Insulation Co.

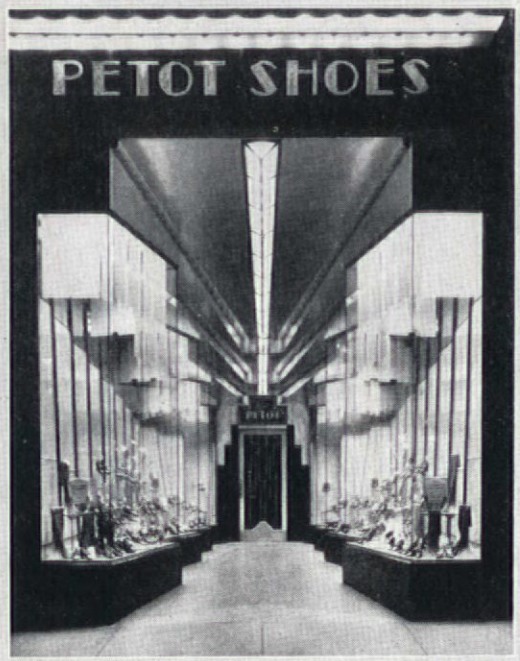
Covering—Pipe and Boiler
Armstrong Cork & Insulation Co.
Johns-Manville Corporation
Ric-wiL Company

Dishwasher—Conover Company

Door Closers—Corbin, P. & F.
Norton Door Closer Co.
Sargent & Company

Door and Window Frames
Andersen Frame Corp.

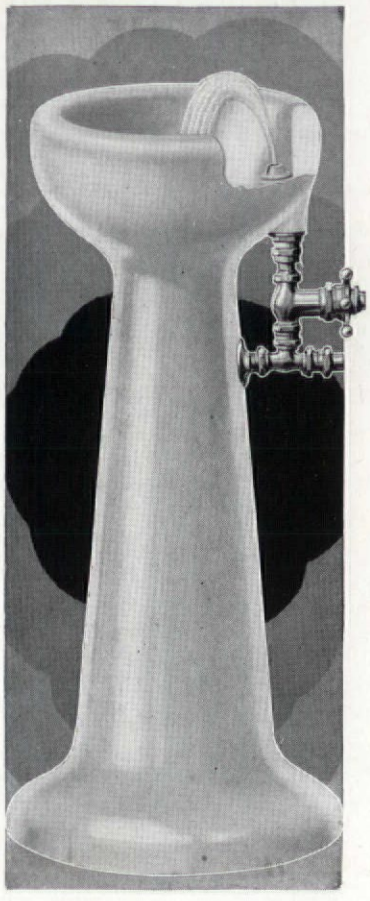
STORE FRONTS



Through years of experience, Kawneer craftsmen have acquired the art of rendering in metal (cast, drawn and extruded) distinctive and efficient store fronts of any size or design. Write for book of outstanding installations.

Kawneer
BRONZE
STORE FRONTS

THE KAWNEER COMPANY, NILES, MICHIGAN
KAWNEER MFG. CO., BERKELEY, CALIF. (SUBSIDIARY)
Manufacturers of
RUSTLESS METAL STORE FRONTS, WINDOWS and DOORS



FOUNTAINS OF BEAUTY!

R-S Drinking Fountains are in keeping with the lines of present day architecture—pleasing, clean in design—they add much to public buildings, hotels, schools and other institutions.

There are many types and styles of R-S Fountains—but all have the R-S Vertico Slant feature. Let us give you full particulars. Write for catalog.

RUNDLE-SPENCE MFG. CO.
70 Fourth St. MILWAUKEE, WIS.

RUNDLE-SPENCE

Doors—Bayley, William, Company
Compound & Pyrono Door Co.
Dahlstrom Metallic Door Co.
Detroit Steel Products Co.
Ellison Bronze Co., Inc.
Hamlin, Irving
Hyde-Murphy Co.
International Casement Co.
Kawneer Company
Kinnear Mfg. Co.
Peelle Company, The
Roddis Lumber & Veneer Co.
Sanymetal Products Co.
Security Fire Door Co.
Thorp Fire Proof Door Company
United Metal Products Co.
Weis, Henry, Mfg. Co.
Wilson, J. G., Corp.
Zouri Co., The

Drains—Crampton-Farley Brass Co.
Josam Mfg. Co.

Drawing Inks
Higgins, Chas. M., & Co.

Drives—Cog Belt
Dayton Rubber & Mfg. Co.

Electric Switches
Hart & Hegeman Mfg. Co.
Hubbell Harvey, Inc.

Electrical Equipment
Adam, Frank, Electric Co.
American District Tel. Co.
Bryant Electric Company
Connecticut Tel. & Elec. Corp.
Fibre Conduit Co.
General Electric Company
Graybar Electric Co.
Hart & Hegeman Mfg. Co.
Holtzer-Cabot Electric Co.
Hubbell Harvey, Inc.
Imperial Electric Co.
Lincoln Electric Co.
National Electric Light Association
Westinghouse Electric & Mfg. Co.

Elevator Doors
Peelle Company, The
Security Fire Door Co.
Tyler Company
United Metal Products Co.

Elevator Inclosures
United Metal Products Co.

Elevators
Otis Elevator Company
Tyler Company
Westinghouse Electric Elevator Co.

Enamels
Du Pont de Nemours, E. I., & Co., Inc.
Pratt & Lambert, Inc.
U. S. Gutta Percha Paint Co.

Engineers—Inspection
Hunt, Robert W., Company

Expanded Casings—Milcor Steel Co.

Expanded Metal
Truscon Steel Company

Fence Post—Steel
American Steel & Wire Co.

Fence—Woven Wood
DuBois Fence & Garden Co., Inc.
Reeves, Robert C., Co.

Fences—American Steel & Wire Co.
Fiske, J. W., Iron Works

Finishing Lime
Ohio Hydrate & Supply Co.

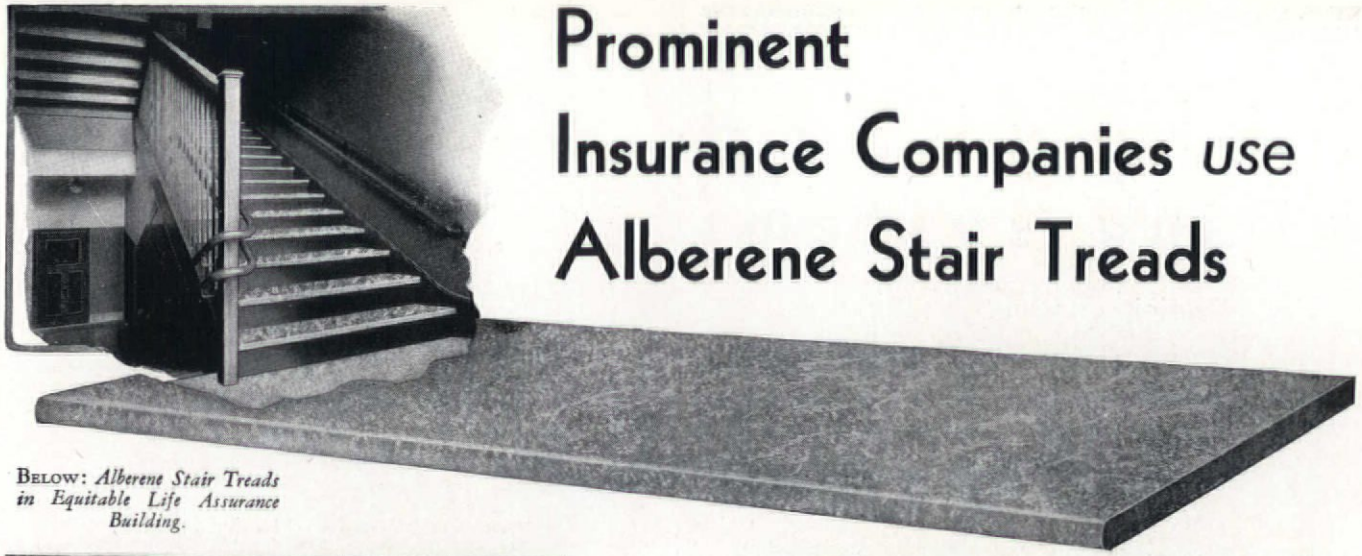
Fire Exit Devices
Vonnegut Hardware Company

Fireplace Construction—Covert, H. W., Co.

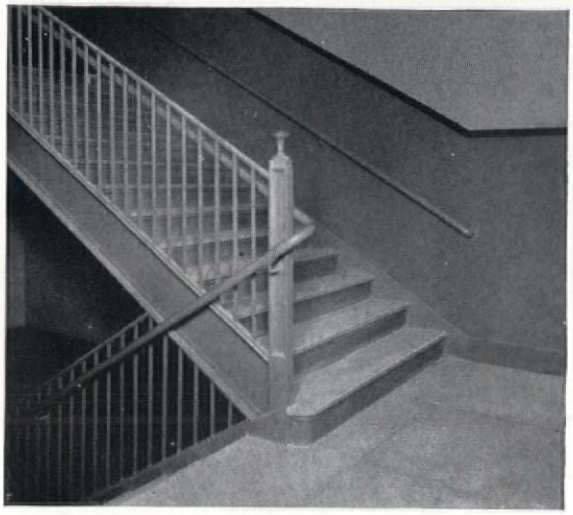
Fireplace Unit—Heatilator Co.

Fireproof Doors, Shutters and Windows
Compound & Pyrono Door Co.
Dahlstrom Metallic Door Co.
Detroit Steel Products Co.
Kawneer Company
Mesker Bros. Iron Company
Peelle Company, The
Thorp Fire Proof Door Company
Truscon Steel Company
United Metal Products Co.

Prominent Insurance Companies use Alberene Stair Treads



BELOW: *Alberene Stair Treads in Equitable Life Assurance Building.*



Insuring permanent satisfaction and no depreciation

1. DURABILITY—Alberene Stone stair treads have been in use for 21 years in the Provident Trust Company Building in Philadelphia. They have been, and still are, free of repair cost.
2. SAFETY—These treads are safe—wet or dry. They do not wear smooth, because the specially selected stone used for treads is high in abrasive content.
3. CLEANLINESS—Alberene Stone is moisture-resisting. Always easy to clean—and to keep clean.
4. FIREPROOFNESS—Streams of cold water can be played on heated Alberene treads without causing any cracking or breaking.
5. APPEARANCE—The natural light, blue-grey color gives good visibility against any background, and it harmonizes with any color scheme.

For use in office buildings or any type of public building, Alberene Stone stair treads and landings offer the advantages given above and others equally important, such as ease of machining, economy of installation, etc. Send for Bulletin on Stair Treads and Interior Uses.

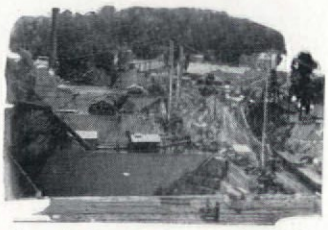
Typical Public Building Installations of Alberene Stone Stair Treads and Landings:

Buildings:	*Architects:*
EQUITABLE LIFE ASSURANCE BLDG., New York	Starrett & Van Vleck
PRUDENTIAL BLDG., Newark, N. J.	Cass Gilbert
FIDELITY MUTUAL LIFE INSURANCE CO., Philadelphia, Pa.	Zantzinger, Borie & Medary
NATIONAL CHAMBER OF COMMERCE BLDG., Wash'ton, D.C.	Cass Gilbert
PROVIDENT TRUST CO. BLDG., Philadelphia, Pa.	Rankin & Kellogg
CITY COURT BLDG., Buffalo, N. Y	Col. Howard Beck
WILLIAM PENN HOTEL, Pittsburgh, Pa.	Janssen & Cocken
MAYO CLINIC BLDG., Rochester, Minn.	Ellerbe & Co.
PENN ATHLETIC CLUB, Philadelphia, Pa.	Zantzinger, Borie & Medary
SOUTHERN RAILWAY BLDG., Washington, D. C.	H. W. Hasselbach
U. G. & I. BLDG., Philadelphia, Pa.	Perry Shaw & Hepburn
NEW YORK STATE OFFICE BLDG., New York City	W. E. Haugaard

ALBERENE STONE CO., 153 W. 23rd St., New York, N. Y.

Branches: Boston, Chicago, Newark, N. J., Washington, D. C. Cleveland, Pittsburgh, Richmond, Philadelphia, Rochester

Quarries and Mills at Schuyler, Virginia



One of the quarries on the 6,000 acre tract at Schuyler, Virginia.

ALBERENE STONE

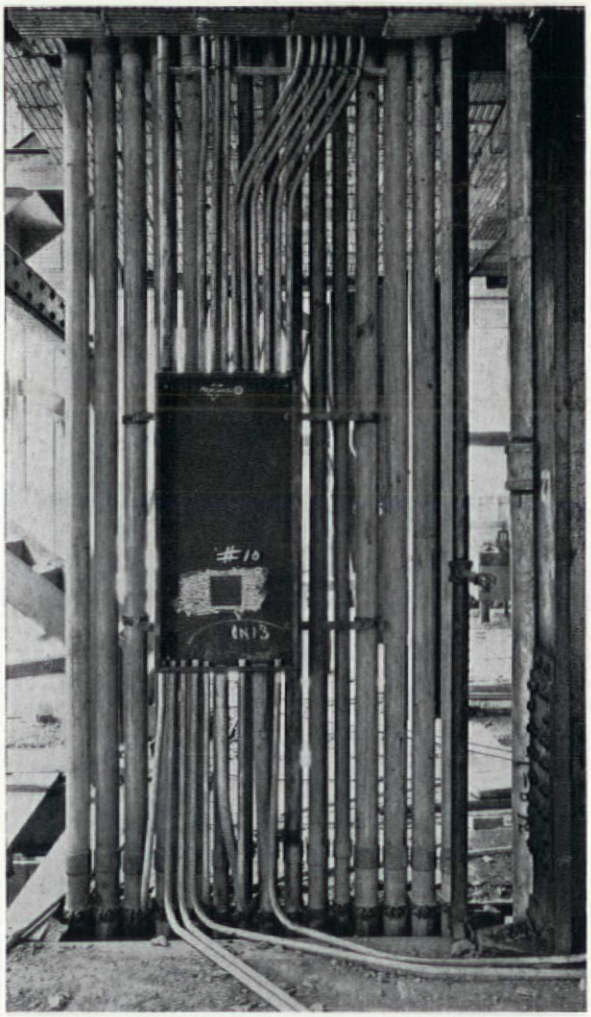
THE NATURAL STONE OF DIVERSIFIED UTILITY



This brochure, ARCHITECTURAL ALBERENE, *sets forth in detail the interior and exterior uses of Alberene Stone.*

Safeguard wiring systems

with rigid conduit. It's the sure way to guarantee permanence. No matter how small the building, rigid conduit will give better protection to the wiring.



For over thirty years Architects have been specifying Garland Conduit. This installation shows "GALVADUCT" in a Municipal Building.

Garland Mfg. Company
Pittsburgh **Penna.**

Fireproofing
See "Concrete Construction," "Covering, Pipe and Boiler," "Fireproof Doors, Shutters and Windows," "Lath-Metal,"

Flashing Wall
Cheney Company

Floor Clips
Bull Dog Floor Clip Co.

Floor Covering
Congoleum-Nairn, Inc.
Stedman Rubber Flooring Company
Wright Rubber Products Co.

Floor Hardeners
Master Builders Co.
Sonneborn, L., Sons, Incorporated
Truscon Laboratories

Floor Plate Steel—Alan Wood Steel Co.
Carnegie Steel Co.

Floor Plates—Alan Wood Steel Co.
Rivet Grip Steel Co.

Flooring
Alan Wood Steel Co.
Armstrong Cork Co. (Flooring Division)
Carter Bloxonend Flooring Co.
Cellized Oak Flooring Co.
Congoleum-Nairn, Inc.
Master Builders Co.
Norton Company
Oak Flooring Mfrs. Assoc. of U. S.
Rivet Grip Steel Co.
Stedman Rubber Flooring Company
Structural Gypsum Corp.
Wright Rubber Products Co.
Zenitherm Company, Inc.

Flooring—Composition
Congoleum-Nairn, Inc.
Zenitherm Company, Inc.

Flooring—Wood Block—Builtup
Carter Bloxonend Flooring Co.

Floors—Fireproof—Alan Wood Steel Co.
Structural Gypsum Corp.

Footlights—Kliegl Bros.

Fountains—Drinking
Century Brass Works, Inc.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.

Furniture—American Seating Co.
Marble, B. L., Chair Co.

Garage Hardware—Corbin, P. & F.

Garden Furniture and Ornaments
Hartmann-Sanders Company

Gas Boilers—American Gas Products Co.
American Radiator Co.
Dahlquist Mfg. Co.

Gas Ranges—American Stove Company

Glass—Window
Adamston Flat Glass Co.
American Window Glass Co.
Pittsburgh Plate Glass Co.

Glass Wire—See Wire Glass

Granite—Bates Bros. Seam Face Granite, Inc.
National Bldg. Granite Quarries Assn.

Greenhouses—King Construction Co.

Grilles—Wickwire-Spencer Steel Co.

Gypsum Plaster—See Plaster, Gypsum

Gypsum Slabs—Atlantic Gypsum Products
Structural Gypsum Corp.

Hardware—Corbin, P. & F.
Norwalk Lock Co.
Rixson, Oscar C., Company
Russell & Erwin Mfg. Co.
Sargent & Company
Soss Manufacturing Company
Stanley Works
Vonnegut Hardware Company
Weis, Henry, Mfg. Co.
Yale & Towne Mfg. Co.

Heat Insulation
Johns-Manville Corporation
Ric-wiL Company

Heat Regulator Oven—American Stove Company

On an aisle of *Silence* . . .

Custom-built floors of cork assure the dignity of perfect quietness . . .



The First Methodist Episcopal Church, Green Bay, Wis. received Honorable Mention for Architectural Merit in the 2nd Annual Christian Herald Church Building Competition. Architect, Edward S. Jansson, Chicago. Associate Architects, Sundt & Wenner, Philadelphia.



Armstrong's Cork Tile, in the aisle of the Green Bay Church, hushes footsteps and harmonizes with the decorative plan of the sanctuary. The floor beneath the pews is of Armstrong's Linoleum.

PART of the beauty of every church service lies in the moments devoted to quiet meditation. Moments when we have no wish to be distracted by material disturbances. Unnecessary noise is ever out of place in the sanctuary of a church. And so a sanctuary should be built for silence.

Armstrong's Cork Tile Floors are made for silence. Their tiles, made from pure, resilient cork, cushion every footstep. No sound of scuffling feet, then, to interrupt the pastor's sermon. No echoing footsteps of a late arrival to mar the service.

You'll find Armstrong's Cork Tile to be a floor of unusual beauty, too. Because the tiles are hand-laid you can create any design you wish. There are three rich shades of brown and thirty-one standard tile sizes to choose from.

And from a practical point of view Armstrong's Cork Tile is logical for any church—for any public floor that must be quiet. This foot-easy floor shows remarkable resistance to wear and tear. Properly cared for, it lasts a lifetime.

Let us send you our illustrated booklet, "Custom-Built Floors of Cork." It will give you complete information about Cork Tile—and Linotile, another tailor-made Armstrong's Floor. Write to the Armstrong Cork Company, Custom Floors Department, Lancaster, Penna.

Armstrong's (A) *Product*

Armstrong's Custom Floors

LINOTILE . . . . . CORK TILE

MADE BY THE MAKERS OF ARMSTRONG'S LINOLEUM

WESTCOS ON DUTY IN THIS BUILDING

The Eighteen Story Petroleum Building, Oklahoma City, Oklahoma.



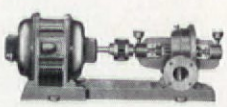
WESTCO *TURBINE* PUMPS

SEE OUR Catalogue in SWEETS

WHEN steady water pressure must be maintained at high levels, you can rely on Westcos to handle the job.

Three Westco Turbine Pumps serve this towering building pictured above. Two 6F6 models are utilized as booster pumps while another Westco 3H6 unfailingly circulates ice water throughout the building.

Westco pumps, because of their wide operating range, are unaffected by fluctuations in city water pressure. The fact that Westcos are the ideal pumps for booster service in tall public buildings has been demonstrated by their record of successful installations.



REVIEW THE IMPORTANT WESTCO FEATURES LISTED BELOW

Wide operating range.
No end thrust at bearings due to perfect hydraulic balance.
Only one moving part.
No metal to metal contact.
High pressures in single stage.
Ball bearing construction.
Direct motor driven at standard motor speeds.
Capacities from 5 to 400 g.p.m.

Write for complete descriptive and performance data

WESTCO-CHIPPEWA PUMP COMPANY

Factory and General Offices, Davenport, Iowa

Branches: NEW YORK · CHICAGO · SAN FRANCISCO

Distributors in Principal Cities

Heating Apparatus
Aerofin Corporation
Air-Way Electric Appliance Corp.
American Blower Co.
American Gas Products Corp.
American Radiator Company
Bryan Steam Corp.
Buffalo Forge Co.
Dunham, C. A., Company
Heatilator Co.
Heggie-Simplex Boiler Co.
Johnson, S. T., Co.
Marsh, J. P. & Co.
Nash Engineering Company
Nelson, Herman, Corp.
Peerless Unit Ventilation Co., Inc.
Pierce, Butler & Pierce Mfg. Co.
Roberts-Gordon Appliance Corp.
Smith, H. B., Company
Sturtevant, B. F., Co.
Titusville Iron Works Co.
Wood Gar Engineering Co.

Hinges—Gravity
Sanymetal Products Co.

Hinges—Invisible
Soss Manufacturing Company

Humidifier
Lewis Corporation

Insulation—Armstrong Cork & Insulation Co.
Cabot Samuel, Inc.
Flax-li-num Insulating Co.
National Gypsum Co.
U. S. Mineral Wool Co.

Interior Communication System
Automatic Electric Co.
Connecticut Tel. & Elec. Corp.
Holtzer-Cabot Electric Co.

Kitchen Units
Conover Company
International Nickel Co.
Olean Metal Cabinet Works, Inc.

Lath—Metal—American Steel & Wire Co.
Milcor Steel Co.
Truscon Steel Company
Wheeling Corrugating Co.

Laundry Chutes—Pfaulder Co.

Lighting Control—Theatre
Adams, Frank, Electric Co.

Lighting Equipment
Belson Mfg. Co.
Graybar Electric Co.
Kliegl Bros.
Landis Eng. & Mfg. Co.
National Electric Light Assoc.
Pearlman, Victor S., & Co.
Smyser-Royer Company
Westinghouse Electric & Mfg. Co.

Lime—Kelley Island Lime & Transport Co.
National Mortar & Supply Co.
Ohio Hydrate & Supply Co.
National Lime Association

Limestone—Indiana Limestone Company
Victor Oolithic Stone Co.

Linoleum
Armstrong Cork Company, Custom Floors Dept.
Congoleum-Nairn, Inc.

Lockers—Steel
Nat'l Assoc. Flat Rolled Steel Mfrs.

Locks—Corbin, P. & F.
Norwalk Lock Co.
Russell & Erwin Mfg. Co.
Sargent & Company
Yale & Towne Mfg. Co.

Lumber—See Woods

Mail Chutes—Cutler Mail Chute Co.

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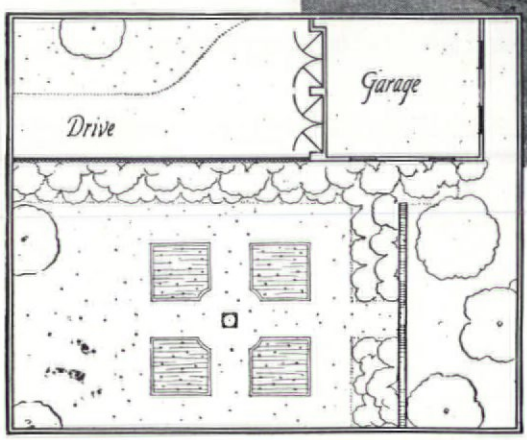
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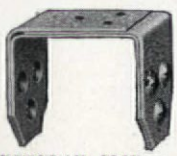
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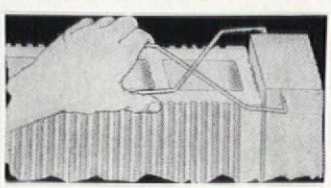
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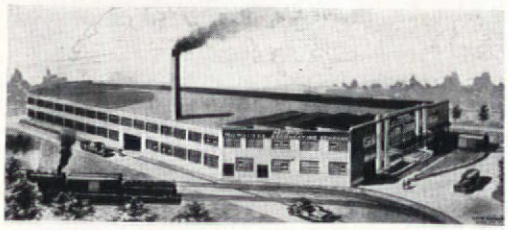
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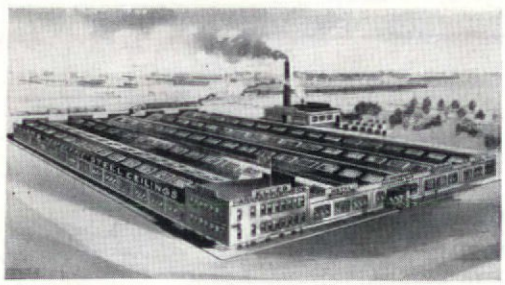
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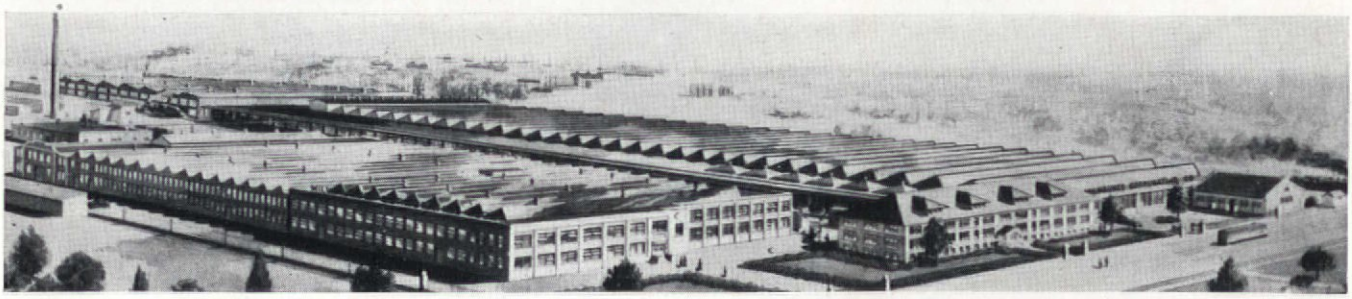
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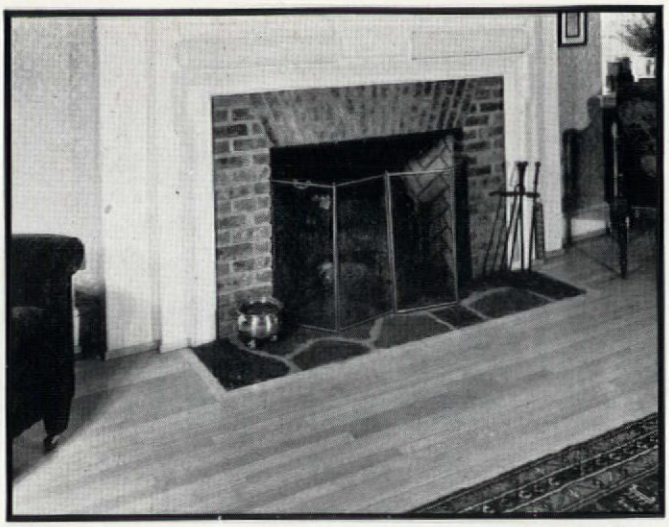


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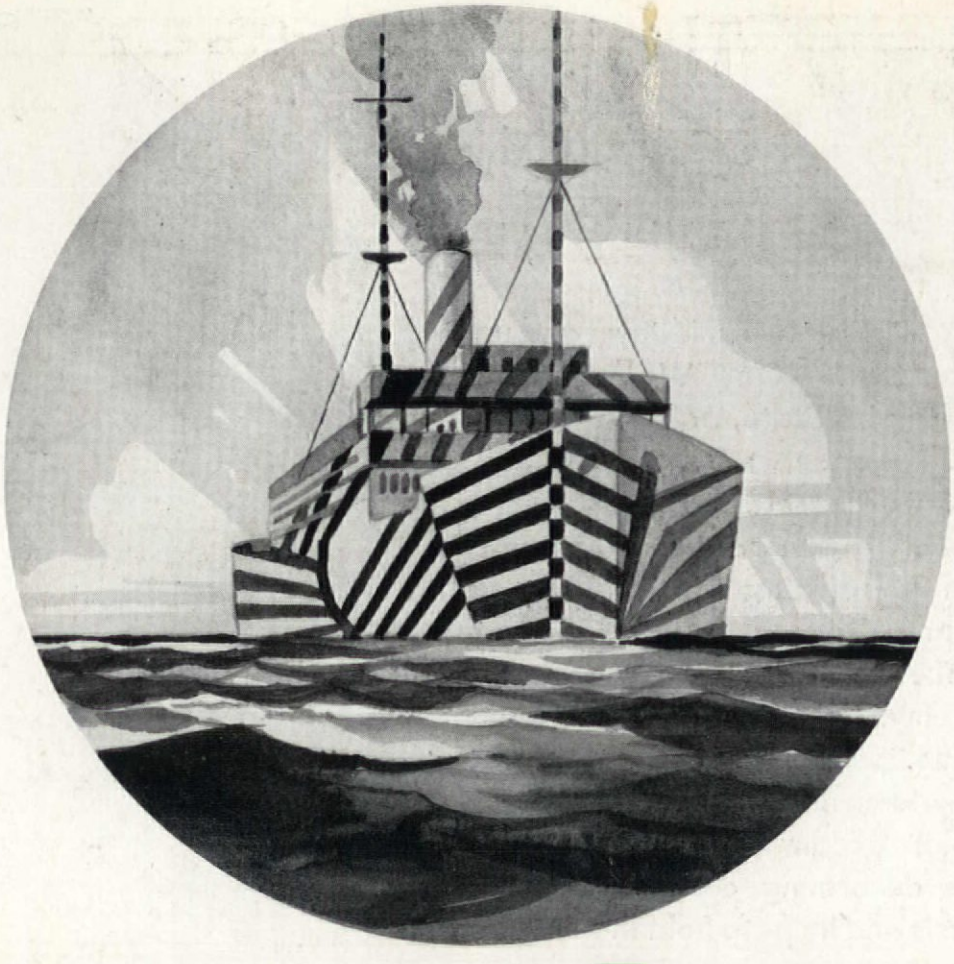
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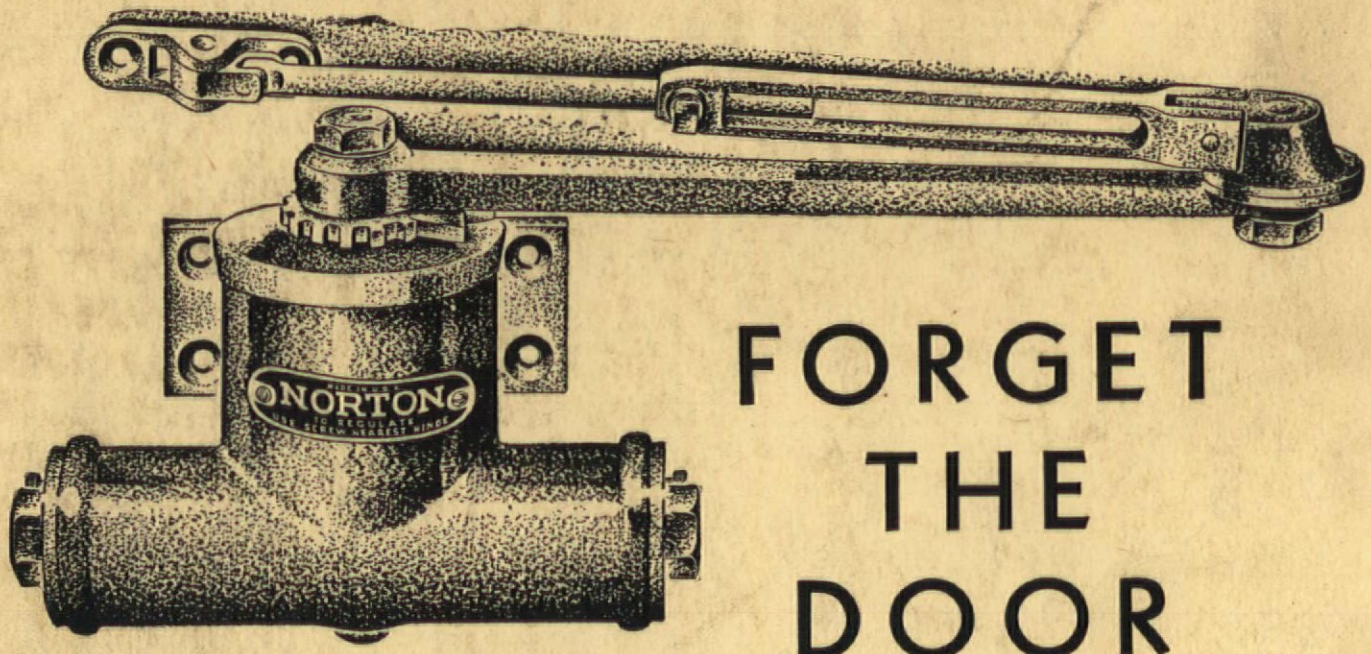
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